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WHEAT SUBSECTOR BASELINE STUDY



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LIST OF ACRONYMS

AC Average Cost

APRP Agricultural Policy Reform Program

CAA Central Audit Agency

CACU Central Agricultural Coopratives Union

CAPMAS Central Agency for Public Mobilization and Statistics

CIF Cost insurance and freight

CY Calendar Year

EPIQ Environmental Policy and Institutional Strengthening IQC

FAO Food and Agriculture Organization (UN)
FIHC Food Industries Holding Company

FOB Free on board FY Fiscal Year

GASC General Authority of Supply and Commodities
GATT General Agreement on Tariffs and Trade

GOE Government of Egypt

HCRWM Holding Company for Rice & Wheat Mills IFPRI International Food Policy Research Institute

kg Kilogram ha Hectare

HYV High Yielding Variety

MALR Ministry of Agriculture and Land Reclamation
MPWWR Ministry of Public Works and Water Resources

MoTS Ministry of Trade and Supply

MT Metric Ton

MVE Monitoring, Verification and Evaluation Unit (APRP)
PBDAC Principal Bank for Development and Agricultural Credit

PPC Program Planning Committee

RDI Reform Design and Implementation (APRP)

SCP Structure Conduct Performance

TAMIS Technical and Administrative Management Information System

TVC Total Variable Cost

USAID United States Agency for International Development

WTO World Trade Organization

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The MVE Unit alone is responsible for any errors and omissions. The findings and conclusions of this study are those of the MVE Unit alone and not of APRP as a whole or USAID.

PREFACE

The Monitoring, Verification and Evaluation (MVE) Unit of the APRP is responsible for monitoring, documenting and assessing the impact of reforms introduced by the policy program. This baseline study provides an overview of the structure, conduct and performance of the wheat subsector in Egypt in 1996/97, the baseline year. It also includes data and analysis of many subsector developments in 1997/98 and some changes that have taken place at the beginning of the 1998/99 marketing season. The report summarizes policy reform issues, opportunities and constraints raised in previous studies relating to the wheat subsector. It also suggests indicators of progress and proposes how to measure them as they relate to the subsector.

The study draws heavily on previous and concurrent work on the wheat subsector carried out by the Food Security Research Unit (FSR) and the Reform Design and Implementation Unit (RDI). IFPRI, in particular, has conducted extensive and significant research on wheat trading and milling in Egypt, carrying out large formal surveys in 1996/97 (of 1,985 traders) and 1997/98 (of 524 millers). This work is supplemented by a survey of 800 wheat producers carried out in the summer of 1998, as well as daily collection of wholesale and retail price data at some 18 markets throughout Egypt from June 1997 to June 1998. Last, IFPRI's nationally representative survey of 2500 households generated valuable information about production and consumption of wheat products in relation to those households' total expenditure patterns. In addition, RDI prepared a wheat subsector map that emphasized the structure of the industry.

While the team benefitted enormously from IFPRI's extensive empirical findings, it still expended a good deal of time and energy trying to collect data on wheat production, marketing, domestic prices and import volume and value. The fruit of this effort has been the establishment of a useful baseline for key policy and trade related variables that APRP will continue to update and monitor.

This report is one of four subsector baseline studies done as part of the MVE Unit's impact assessment program. The other three are for fertilizer, cotton and rice. By the end of the project, MVE will update the time series and examine the set of performance measures assessed in this paper. The final performance assessment will compare the organization and performance of the subsector at two discrete points in time and discuss how the APRP program contributed to changes and improvements in the wheat subsector.

This study focuses relatively more attention on policy measures than other baseline studies. It suggests ways to improve pricing of wheat and wheat products and to manage imports to dampen price variability. It also analyzes the structure, conduct, and performance of the subsector. The MVE Unit hopes that the Government of Egypt will consider the study's recommendations valuable for the management of Egypt's wheat trade, milling, and consumption.

EXECUTIVE SUMMARY

Egypt has the highest per capita consumption of wheat and bread in the world. It also has a fairly complicated system of subsidizing bread and flour. Because of the high rate of consumption and because of the expensive subsidy system, it is important that the production and marketing chain for wheat and flour be as efficient as possible. Any improvements in efficiency in the Subsector could be quite important for the Egyptian economy. This study is designed to provide a baseline against which future changes in policy or the marketing system could be measured. The bread and flour subsidies are considered important elements in current Egyptian economic and social policy. Thus, changing these subsidies was not an objective of this study. Changing these subsidies is not among the policy alternatives presented below, nor is it the objective of those alternatives.

FINDINGS: STRUCTURE OF THE WHEAT SUBSECTOR

Structure of Fino Mills. The 72% component produces flour for bakeries and other processors and for direct use by consumers. It uses only imported wheat, much of which is hard wheat. There are 10 private and 19 public mills engaged in producing 72% flour. These mills are prohibited from producing 82% flour. Currently about 1.7 million MT of imported wheat is used to produce 1.22 million MT of 72% flour annually. Wheat import, milling, marketing, and distribution of 72% flour are, in a sense, free of government intervention. However, 17 of the mills that are publicly owned have recently produced 70% of the 72% flour (0.85 million MT), a fraction that is declining rapidly as more private mills come into full operation.

Structure of Baladi Mills. The 82% flour and the baladi bread are subsidized by the Government of Egypt (GOE). Consequently, the market system for this flour is highly regulated through the General Authority for Supply Commodities (GASC). At present, about 6 million MT of wheat are converted into subsidized 82% flour. Of that, about 20% or 1.2 million MT is from domestic production, with the remaining 4.8 million MT being from imported wheat. The Principal Bank for Development and Agricultural Credit (PBDAC) plays a major role in procurement of domestic wheat for the subsidized flour system.

There are 109 public mills that handle about 5.06 million MT (or 86%) of the 82% flour milling. Thirty three private mills handle the milling of the other 14% on a contract basis. The flour is sold by GASC to baladi bread bakers and retail flour outlets at a substantial discount on its costs. Allocation of flour to bakeries and retail flour outlets is done by GASC. Urban retail outlets receive 82% of the flour that will be baked and sold as bread and 27% of the flour that is sold directly to the consumer as baladi flour. It is widely believed that considerable leakage exists in the subsidized flour system.

Structure of Village Mills. Over 5,200 licensed and perhaps 8,700 unlicensed rural mills operate a service-oriented business of milling wheat for producers on demand. These millers may grind approximately 4 million tons of wheat per year with the capacity and use of the mills varying respectively with location and season.

FINDINGS: CONDUCT OF THE WHEAT SUBSECTOR

Conduct of Domestic Marketing. PBDAC was formerly the mechanism for collecting the wheat quotas while offering credit to farmers. Since deregulation, PBDAC has continued to purchase wheat and has recently begun offering cash on delivery to farmers to compete with private traders. The extensive role of private traders may be growing. Traders often finance input credit and facilitate transportation of wheat to mills. These traders have the opportunity to capture additional margins if they expand their facilities to move and store wheat.

In the main producing regions, farmers themselves utilize several storage and transport options. This is motivated by their own consumption of large portions of their wheat production. Combined, these facts suggest that wheat producers do have a degree of choice in determining quantity supplied. Producers are not indifferent to price changes, as seen in the vast increase in land farmed for wheat since the rise in wheat prices since deregulation.

Conduct of Importing. Handling 75%-90% of total shipments, GASC is the primary importer of wheat for Egypt. In recent years, importation of flour has almost disappeared and shipments of wheat have risen to well over 6 million MT/year of wheat.

Conduct of Fino Mills. GASC provides all of the imported wheat to the public fino mills, capturing scale effects from importing. Transportation logistics are usually handled by public agencies. Thus, while public mills have less control of their supply flows, they may have less costs associated with these activities. Private mills are nearly perfectly integrated with their input supply. Mills operate as importers, handle their own transportation and utilize an average of 30 to 40 days of on-site storage to ensure efficient streams of supply. To capture boat importation scale effects, some mills have good reasons to handle supply horizontally with other private mills. Supply competition does not exist because importing of wheat is prohibited for all private entities except for owners or renters of mills.

The projected fino milling capacity for 1999 is approximately double the total demand for fino flour. With over-capacity in the market, competition among the mills to secure sales contracts with buyers is strong and will likely become fierce with new mills coming online. Market share objectives will become more important than tacit collusion in maintaining profitable price offerings. The fino flour is a regulated standard of 72% wheat extract, and therefore product differentiation is not a marketing option for the millers. The use of contracting and transportation conveniences may be the only tools the mills have to vertically differentiate their fino flour. With profit incentives and coordination already in place for supply integration, private millers may find further motivation for alignments or consolidation in efforts to capture scale effects in marketing and transportation. This may be especially pertinent in light of the fact that some large private mills have been built in remotely located areas to take advantage of tax incentives in the new industrial cities.

As the market price of fino flour drops with excess supply, we should expect that mills with either the lowest marginal costs or the strongest buyer contracting will survive. However, in that the public mills may have cost advantages in terms of assets whose depreciation is not expensed to the mills, arranged

wheat supply, tax and utility payment savings, and debt capacity, the newer and perhaps more efficient private mills may not be as competitive as one might think.

Conduct of Baladi Mills. Baladi mills receive both domestic and imported wheat for processing. The domestic wheat is delivered to the mills by independent traders, PBDAC, cooperatives and farmers. As much as 80% of wheat milled into baladi flour is imported and arrives to the mills via GASC transportation. As with fino public mills, baladi mills have little role in the wheat supply channels. GASC fixes a mill-specific price of wheat supplied according to ownership, technology and age of the mill. Private mills are smaller on average than public mills and receive a lower milling fee.

The wheat input is processed and sold to the flour and bran markets. The GOE sets bran prices, but these prices are not enforced. Thus, mills do have opportunities to seek profits in selling bran at a higher free market price. Flour stores pay mills LE 500/ton for baladi flour, and bakeries pay mills LE 290/ton for flour. GASC subsidizes the bakery sales by LE 210/ton, leaving millers price indifferent between the two outlets. Transportation logistics to and from the public mills are not considered in that GASC pays for all transportation costs for the public facilities. Transportation cost for private mills represents 11% of their operating costs.

Millers have little flexibility in the input procurement or marketing aspects of their business. As long as there exist supply of wheat to mills, ready buyers of baladi flour, and profit incentives for mills, their objective must be either to maximize quantity sold or to minimize costs. The former is only appropriate if mills operating at under-capacity can influence the quantity of GASC supply. Another method by which millers can increase quantity sold is to increase the moisture content of the final flour product beyond regulation specification.

The latter objective of minimizing costs is perhaps more universal but often less effective. Many of the costs incurred at the mills are either fixed costs or per unit costs which cannot be altered. Labor is the largest variable cost item for public mills. Private mills incur large energy costs from which public companies are sometimes exempt. These costs would be lessened by steady processing of wheat, but since wheat supply is not controlled by the mill, and baladi mills have only an average of 3 to 4 days of storage capacity, mills can do little to minimize variable costs.

FINDINGS: PERFORMANCE OF THE WHEAT SUBSECTOR

Performance of Importing. The infrastructure and capabilities of GASC are assumed to be adequate and efficient. Until mid-1996, it appeared that GASC was clearly effective in securing purchase prices below the world market prices (refer to Figure 3.2). In the last two years, however, unit purchase prices for wheat have exceeded the simulated CIF prices, which may indicate a lessened degree of efficacy in GASC importing practices.

Performance of Fino Mills. If the fino flour market is competitive, prices would be expected to equalize across markets after accounting for transportation differences from the production facilities. Badiane and Kherallah and later Mendoza and Gruhn find that although there is a growing interdependency in the fino flour market, the price transmission of fino flour between the urban and rural

areas is poorly connected. This inefficient pricing mechanism would suggest that there is potential for spatial arbitrage in storing and transporting fino flour.

IFPRI results show that there are efficiencies in scale, capacity utilization, location and ownership. Price-cost margins have been large in fino flour mills relative to baladi mills. Some have argued that baladi mills are operating below the sustainable breakeven point. However, if we assume that baladi mills work near the breakeven point, the large price-cost margins would suggest that the fino mills have been able to capture either effective market power pricing, perhaps due to previously large entry barriers to milling, or efficiency in the technology and size of fino mills relative to baladi mills. These margins are rapidly diminishing as competition drives down the price of fino flour.

If tacit collusion existed in fino flour pricing, predatory behavior and under-capacity utilization should erode price cost margins, at least temporarily in an environment of excess supply. Yet, the excess supply may cause mill failures where technological efficiency is highest. Estimates of average milling costs at Egyptian fino mills were in the LE68-75/ton range at full capacity. These cost figures suggest that if mills can survive in the newly competitive domestic market, Egypt may be able to compete internationally in flour milling.

Performance of Baladi Mills. The average milling fee for public baladi mills is LE 30 to 46/ton; the fee for privately contracted mills is only LE 25 to 35/ton. GASC wheat supply prices are determined by size, age, and ownership of the mills. Private mills are located in the traditional farming areas of the Delta and Cairo, which may imply that private mills are older on average than the public ones. Private mills are also smaller in size. Both of these structural considerations may induce higher GASC input prices. These items also may imply higher costs in production. IFPRI has shown that there are scale effects in milling. The result is that the price-cost margin for private baladi mills would probably be lower than that for public mills unless private mills either 1) achieve higher milling performance and equipment maintenance which reduces costs or 2) are able to capture more supply channels such that their production operates at capacity level.

Estimates of operating profit margins confirm a difference in performance between public and private mills. The average operating profit margins, without considering the cost of capital, are LE 18.4/mt and LE 10.4/mt for public and private mills respectively. The fact that all private mils are stone mills allows us to compare the performance of the public to private stone mills. The profit margins of stone mills are identical irrespective of ownership; however, these estimates state that the public stone mills have a larger milling fee and yet obtain only the level of profitability of private mills. This result suggests that there are some efficiencies to be gained from privatization.

A final question regarding the performance of baladi mills is whether the above margins are sufficient to meet the costs of capital not included in the operating margins. In the IFPRI survey of mills, many managers and owners of baladi mills complained that the GASC fee did not even cover their costs (Kherallah et al., 1998, p. 99). Such a situation might encourage millers not to comply with the baladi flour procurement system if there were avenues to sift wheat further and sell the production at higher prices as fino flour. However, if leakages are feasible in the system, reasons would exist to exploit the opportunity whether the mill were profitable or not.

Performance of Village Mills. On average, mills charge LE 42/ton for wheat milling and have a price-cost margin of LE 18/ton. Their largest costs are energy and communication, labor, and equipment maintenance, which each account for about 30% of total costs. These figures are little variant with mill size.

POLICY OPTIONS

The study team recommends a number of policy options for consideration by the Government of Egypt. Supporting details for these are given in Chapter 7. The policy options are:

Privatize Public Flour Mills

to improve milling technology and efficiency to maintain credibility of privatization policies

Move to a Tender System for 82% Flour by eliminating administratively determined milling margins

Tender for 82% Flour Milling mills would compete only on milling charge

Remove Transportation Impediments to allow product flows among the governorates

Institute Effective Grades and Standards for Wheat should lead to higher price differences based on quality

Blend 82% Flour and Maize Flour at the Mill to reduce leakage

Privatize Public Transport and Storage to enhance competition, improve efficiency

Link Domestic and World Wheat Markets to eliminate the price separation and possible leakage between the two markets

Improve Information Systems to assist all market decision makers, public and private

Clarify Rules on High-Quality Flour allow multiple grades of higher quality flour to satisfy niche demands

1. INTRODUCTION AND BACKGROUND

Wheat, flour, and bread are extremely important not only to Egyptian agriculture but also to the Egyptian way of life. Egypt has the highest per capita consumption of wheat and bread in the world. It also has a fairly complicated system of subsidizing bread and flour. Because of the high rate of consumption and because of the expensive subsidy system, it is important that the production and marketing chain for wheat and flour be as efficient as possible. That is, because the Subsector is quite large, any improvements in efficiency in the Subsector could be quite important for the Egyptian economy. This study is designed to provide a baseline or backdrop against which future changes in policy or the marketing system could be measured.

1.1 Study Context and Problem

Wheat and bread constitute more than one-third of the daily caloric consumption in the Egyptian diet. With increases in production in recent years, Egypt is today producing almost 6 million metric tons (MT) per year and importing about 6.5 million MT. That level of imports makes Egypt one of the two largest wheat importers in the world. About half of the total wheat supply (about 6 million MT) runs through the subsidized bread and flour system. The subsidized flour is a different product - 82 percent extraction rate - from the non-subsidized commercial flour (72 percent extraction rate). The marketing, milling, and distribution are handled under different rules and regulations to accommodate the subsidy on 82 percent flour and *baladi* bread.

The bread and flour subsidies are considered important elements in current Egyptian economic and social policy. Thus, in the context of this study, the subsidy is considered a given. Our problem is to characterize the current Subsector, both regulated and non-regulated components. In so doing, we will create a baseline against which future changes can be measured. In addition, we will examine possible future policy changes that might be considered to improve the functioning of the wheat/flour Subsector given that the subsidy will continue to exist for at least the near future. In other words, we will ask what changes might be made to improve the efficiency of the current system while at the same time achieving the bread and flour subsidy policy objectives.

1.2 Study Objectives

The basic objective of this study is to establish a baseline for the wheat subsector in Egypt. Some of the specific tasks or sub-objectives include the following:³

- Summarize data and information from recent studies on the wheat/flour subsector.
- Establish a database on import quantities and prices.

¹Badiane et al. 1998, p.1..

²Krenz. 1998.

³Gary Ender, "MVE Unit - APRP Scope of Work Wheat Subsector Baseline," September 1998.

- Analyze the relationships among producer, wholesale, processor, and retail prices in the wheat/flour subsector.
- Summarize and evaluate recent trends and shifts in national production and regional production shares.
- Provide an assessment of subsector performance, constraints, and opportunities for increasing efficiency.
- Provide guidelines for a data base that could be maintained for future monitoring and impact assessment in the subsector.

Perhaps it is also important to indicate what this study will not do and to describe our general approach. First, we will not repeat in detail the results of the several excellent studies that have been accomplished within the past year. We will draw heavily upon those studies to accomplish the task of describing the current situation in the subsector. Resources and time available for this study are very limited, and we must make the best possible use of previous work in this area. In this study we will not describe the entire history of wheat and flour policy in Egypt. That has been done quite well in the documents referenced in this study. Rather, we will focus on the very recent changes made in the early 1990s and in some cases as far back as 1987.

In general, our data sets will run from 1987 to the present, if reasonable data is available that far back. In some cases, we will go back as far as 1978 when data permits and there is something useful from the earlier period to cast light on the current situation. All the data sets developed or adapted in this study will be provided to the project for subsequent use in monitoring and evaluation.

1.3 An Overview of the Wheat/Flour Subsector⁴

Krenz characterizes the Egyptian wheat/flour subsector as having three major components: the 72% high quality unregulated flour, 82% subsidized and regulated flour, and the rural component. The outputs from the milling of 100 kilograms (kg) of wheat and the origin of the 72% and 82% labels are illustrated below:

72 kg of 72% flour

8 kg of flour #2

2 kg of white shorts

(The sum of these three represents 82% flour.)

5.5 kg of red shorts

5.8 kg of fine bran

8.3 kg of coarse bran

(The 1.6 additional kg represents the water added in the milling process.)⁵

⁴This section draws heavily upon Krenz.

⁵Personal interview with Dr. Hamza Hamza of U.S. Wheat Associates, Cairo.

For wheat milled at small rural mills, the flour may be partially sifted at the mill or by hand at home after milling. Thus, the ultimate extraction rate for human consumption is highly variable.

The 72% component produces flour for bakeries and other processors and for direct use by consumers. It uses only imported wheat, much of which is hard wheat.⁶ There are 10 private and 17 public mills engaged in producing 72% flour. These mills are prohibited from producing 82% flour. Currently about 1.7 million MT of imported wheat is used to produce 1.22 million MT of 72% flour annually. Wheat import, milling, marketing, and distribution of 72% flour are, in a sense, free of government intervention. However, 17 of the mills (63% of the total) that are publically owned have recently produced 70% of the 72% flour (0.85 million MT), a fraction that is declining as more private mills come into full operation.

The 82% flour and the baladi bread are heavily subsidized by the Government of Egypt (GOE). Consequently, the market system for this flour is highly regulated through the General Administration for Supply Commodities (GASC). At present, about 6 million MT of wheat are converted into subsidized 82% flour. Of that, about 20% or 1.2 million MT is from domestic production with the remaining 4.8 million MT being from imported wheat. The Principal Bank for Development and Agricultural Credit (PBDAC) plays a major role in procurement of domestic wheat for the subsidized flour system. The domestic procurement price is now about 23 percent higher than the price of imported wheat.

There are 109 public mills that handle about 5.06 million MT (or 86%) of the 82% flour milling. Thirty three private mills handle the milling of the other 14% on a contract basis. The flour is sold by GASC to baladi bread bakers and retail flour outlets at a substantial discount on its costs. The difference between GASC selling price and its costs represents the subsidy on baladi bread and 82% flour. The bread/ flour subsidy amounted to about LE 2.87 billion in 1996/97, which represents about 4.2% of total government expenditures and two-thirds of total food subsidy expenditures. Allocation of flour to bakeries and retail flour outlets is done by GASC. Earlier studies have concluded that the allocation has an urban bias, especially for bread. Urban bakeries get 82% of the baking flour, whereas urban retail outlets get 27% of the flour destined for retail outlets. More details on the consumption profiles are included in the consumption chapter that follows. It is widely believed that considerable fraud and leakage exists in the subsidized flour system. This issue also is discussed in greater detail below.

The remainder of domestic production goes into what has been called the rural component. About 80% of domestic production or 4.6 million MT in 1997 went into that channel. This wheat is milled in small rural mills and consumed largely in rural areas. Often the wheat is milled on a fee basis, so that the farmer recovers the flour from his own grain. The flour is sometimes called 100% flour, but

⁶Some domestic durum wheat is used for production of semolina.

⁷Ahmed et al. 1988, p.xi, Bouis et al. 1998, Table 1. These two IFPRI sources actually have different subsidy cost values for sugar and cooking oil, so the percentage of total subsidy cost attributable to bread/flour differs between the two reports.

that is a misnomer, at least in terms of what is consumed in the household.⁸ In some cases, sifting occurs at the mill, but in many cases, most of the output from milling is returned to the home for hand sifting. The degree of sifting is a matter of individual preference. The bran that is sifted out (either at the mill or at home) is fed to animals.

Figure 1-1 contains a wheat subsector map (adapted from Krenz) which depicts the various operations and components described above. Krenz contains additional maps of the components, but it is not necessary to replicate them here. We have provided a brief overview of the subsector to provide a point of departure for the more detailed descriptions and analyses that follow.

1.4 A Summary of Wheat/Flour Subsidy Policies in Egypt

At present, four food commodities are subsidized in Egypt: baladi bread, 82% flour, sugar, and cooking oil. Two-thirds to three-fourths of total food subsidy cost is attributable to the bread and flour subsidies (the amount differing between the two IFPRI reports). Clearly, the bread/flour subsidy is important in terms of total cost and in terms of benefits to Egyptian consumers. On a per capita basis, the flour/bread subsidy amounts to LE 48 per person per year, or LE 192 for a family of four. The subsidy rates for bread and flour are 57% and 43% respectively. Baladi bread sells for Le 0.05 and the estimated cost is LE 0.12. Flour sells for LE 0.55, and its estimated cost is LE 0.97. Both bread and flour are, in principle, available to all consumers for the same price regardless of location or income.

In 1996/97 about 73% of the subsidized 82% flour was distributed to 10,693 bakeries for making baladi bread. About 71% of the bakeries are located in urban areas. Bakeries receive a daily quota of subsidized flour and are required to make 10 loaves of baladi bread (averaging 130 grams each) per kg of flour. The bread is sold through stores, usually close to the bakeries, run by local governments. Proceeds to the bakeries are supposed to be sufficient to cover costs plus a normal profit.

Subsidized flour is sold directly to consumers from warehouses, usually in 25 kg bags. There are 20,996 of these warehouses in Egypt, 72% of which are in rural areas. As indicated above, most of the flour is distributed in rural areas, and most of the bread in urban areas. The sales price for flour to the warehouses, however is higher than the sales price of flour to bakeries. Flour to warehouses is LE 500 per MT, and it is LE 290 to bakeries. The mills receive LE 500 in both cases with the difference (LE 210) being paid to the mills by GASC.

1.5 Outline of the Study

The remainder of this report is divided into six additional sections plus an annex on data needs and issues. Chapter 2 covers domestic wheat production and marketing. It includes data on wheat

 $^{^{8}}$ What is termed "whole wheat flour" in the West is usually about 97% flour with the 3% course bran removed.

⁹Ahmed et al. 1998, pp. 5, 71, and 72.

area, yield, production, cost of production, prices, and marketing channels. Chapter 3 covers wheat imports. It includes a history of wheat import quantities and values and a history of world wheat prices and comparison of the two series. In addition, the system for commercialization of imported wheat is described.

Chapter 4 covers wheat transformation and concentrates on the milling subsector. In addition to the profile of mills and the systems for 72% and 82% flour, the section also covers storage and transportation issues. Chapter 5 covers domestic wheat consumption. It provides time series data on flour consumption by type and region, flour prices by type and region, consumption of bread products, bran usage and prices, and rural wheat consumption.

Chapter 6 covers market structure, conduct, and performance and draws heavily on the preceding chapters. Market structure is described at the different stages including wheat production, trading, milling, and consumption. Conduct covers relationships among farmers, cooperatives, traders, state organizations, millers, and retailers. It examines the degree of competition and impediments to competitionat each stage. The performance section continues that analysis to include coverage of price spreads, vertical and horizontal price transmission, and an analysis of the extent of co-integration of market prices.

Chapter 7 examines some alternative policies that might improve the efficiency of the existing marketing system given that a flour/bread subsidy will continue to exist for the near future. It also provides a possible path for moving from the current policy environment to a more efficient system.

Finally, there is a data annex which describes the data accumulated for this study and delineates a plan for maintaining this data base and using it for monitoring changes in the future. It also includes data sources and suggestions for improving data quality.

Figure 1.1: Wheat Subsector

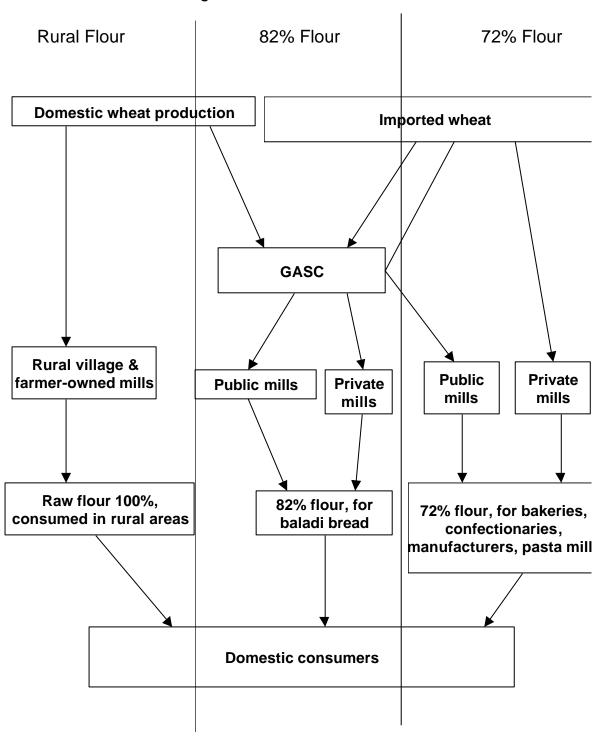


Figure 1-1 - Wheat Sub-sector

2. WHEAT PRODUCTION AND SUPPLY

The purpose of this chapter is to characterize the wheat production sector, highlighting regional divergences and attributes of wheat production/producers that would be influential in response to policy initiatives. This section includes a discussion of five issues. First, a brief overview of the market outlets for wheat production will be described. Second, the impact of the 1987 wheat policy liberalization will be analyzed to infer conclusions regarding the adaptability of producers. Third, turning to wheat production itself, the cost structure will be developed and post-reform cost trends estimated. Fourth, farmers' marketing decisions will be considered in light of preferences and opportunities. Finally, the framework for a supply response estimation will be established.

2.1 Overview of the Sector

Wheat continues to be the most important winter crop grown in Egypt. It is produced widely in both the older farming lands of the Delta and in the newly-farmed lands reclaimed from the desert. Wheat and Egyptian clover (*berseem*) form the traditional winter rotation to the summer crops of maize and rice. Accounting for over 97% of the total wheat crop, the soft varieties dominate domestic production. The exception to this is found in the southern governorates of Assiut, El-Minya, and Sohag, where some hard to extra-hard types (durum) of wheat are grown. Approximately 1.5 million farmers grow wheat in a single year. This number, however, does not reflect the larger number of farmers who rotate wheat within a three-year period, often in communal cooperation. Cumulatively, Egyptian farmers' involvement in wheat production is extensive.

2.1.1 Supply Market Channels / PBDAC

An elaborate procurement system involving farmers, cooperatives, the Principle Bank for Development and Agricultural Credit (PBDAC), and GASC continues to exist in Egypt from prior to the reform program of 1987. Under this system, PBDAC pays farmers and cooperatives for the wheat delivered based on a predetermined wheat price, less the cost of any PBDAC-provided credit or inputs advanced to the farmer during the season. PBDAC then weighs, grades, treats, packs, and stores domestic wheat in *shonas* or warehouses for subsequent delivery to the mills. Accordingly, PBDAC operates as a wheat procurement agency for GASC. The Bank's marketing channel is as follows: (1) Farmers, rural wheat traders, and cooperatives deliver wheat to PBDAC. (2) Wheat delivered to PBDAC is paid for out of a GASC account at the Bank at which point it becomes the property of GASC. (3) The Bank then receives a LE 3 per Ardeb for the costs of receiving, weighing, appraising, storing, and maintaining wheat until it is moved, at GASC's expense, to the flour mills. The estimates of 1997 are that approximately 2.577 million ardeb (or equivalently 387,000 tons) were procured by the Bank.

¹The data for this section are drawn from the recently completed *MALR/IFPRI Wheat Producer Survey*, compiled June, 1998, as well as from numerous other publications of the Ministry of Agriculture and Land Reclamation (MALR).

¹¹Krenz, 1998.

2.1.2 Supply Market Channels / Cooperatives & Traders

Other agencies/firms which operate in this supply system are village cooperatives and private wheat traders. The cooperatives often act as procurement agents for GASC or the public sector flour mills. In 1997, the total amount of wheat which cooperatives purchased was about 1.9 million Ardeb (286 thousand tons), delivered either to PBDAC or directly to the public mills. The cooperatives' commissions are in the neighborhood of 1- 3 percent on all transactions. Private wheat traders are individuals who are engaged in wheat/flour trade at the village level. They purchase wheat from farmers and sell mainly to public mills and PBDAC. On average, the private wheat traders handled 1,175 Ardeb (182 thousand tons) of wheat, according to the 1996 survey conducted by the Food Security Unit, IFPRI/APRP.

2.1.3 Farmers' Choices of Market Outlet

While PBDAC and cooperatives act as purchasing agents for GASC's account, farmers may choose to sell to private traders who often offer immediate cash payment or furnish transport for wheat. Table 2.1 and Table 2.2 present sample results from the *Producer Survey* showing to whom farmers chose to sell their wheat and why they made that choice. The results in Table 2.1 suggest that the majority of wheat is sold to traders, not to PBDAC or cooperatives. These statistics are contrary to the quantitative estimates quoted previously. One might conjecture that the *Survey* question was not explicit in defining the "purchaser" of wheat; perhaps the relationship of transport facilitator was not well established. However, the conflicting conclusions regarding the purchasing share of each buyers type warrant further attention.

Table 2-1: Farmer's Market Outlet for Wheat Production by Region 1998 (on quantity sold basis)

	Trader	Miller	Cooperativ e	Neighbor	Village Bank (PBDAC)	MALR	Other
Urban	70.50%	0.00%	1.00%	0.00%	21.20%	7.30%	0.00%
Lower	71.60%	1.90%	4.90%	1.90%	3.80%	13.60%	2.40%
Middle	38.50%	15.80%	11.80%	0.40%	30.70%	2.90%	0.00%
Upper	48.10%	32.10%	5.80%	9.30%	4.70%	0.00%	0.00%
Frontier	59.00%	8.80%	6.40%	1.80%	15.10%	7.90%	1.00%

Source: Calculated by the authors from June, 1998. IFPRI wheat producer survey data.

Additionally, the *Survey* results presented in Tables 2.1 and 2.2 begin to demonstrate regional variation. Whereas farmers in Urban and Frontier Governorates market their product primarily through traders, farmers in Middle and Upper Egypt sell significant proportions of their wheat to millers directly. Only Lower Egyptian farmers sell quantities directly to MALR.

Table 2-2: Farmers' Reasons for Market Outlet Selection, 1998

Regions in Egypt	Price	Location	Gives Advance	Provides Input Credit	Offers Quality Premium	Does Not Rate Quality	Trust
Urban	65.63%	12.50%	0.00%	0.00%	0.00%	3.13%	18.75%
Lower	57.44%	27.18%	0.51%	3.59%	2.56%	1.54%	7.18%
Middle	34.62%	28.85%	1.28%	0.64%	1.92%	11.54%	21.15%
Upper	70.73%	17.07%	4.88%	6.10%	0.00%	0.00%	1.22%
Frontier	31.58%	0.00%	0.00%	47.37%	0.00%	0.00%	21.05%

Source: Calculated by the authors from June, 1998. IFPRI wheat producer survey data.

In the Frontier states, trust and input credit offerings are reasons for choosing to sell the product to traders. Lower Egyptian producers state that quality premiums are frequently reasons for their marketing choice. The *Survey* results show, however, that well over half of Egyptian farmers choose their selling market based on price. This result is expected and drives the next results which find very little variation across regions of the average price received for wheat production. Table 2.3 presents a summary from the *Producer Survey* of price received in 1997 for wheat sold by the farmer. The means have been averaged across farmers and then across wheat quantities. The latter exercise suggests that, except in Upper Egypt, scale factors do not appear to be important for the farmer in wheat marketing.

Table 2-3: Average Price of Wheat Sold by Farmers, 1998

Regions in Egypt	Average Price (LE/Ardeb) Averaged by Farmer	Average Price (LE/Ardeb) Averaged by Quantity
Urban	97.57	98.76
Lower	94.53	95.77
Middle	101.19	97.00
Upper	10656	117.48
Frontier	97.63	98.93

Source: Calculated by the authors from June, 1998. IFPRI wheat producer survey data.

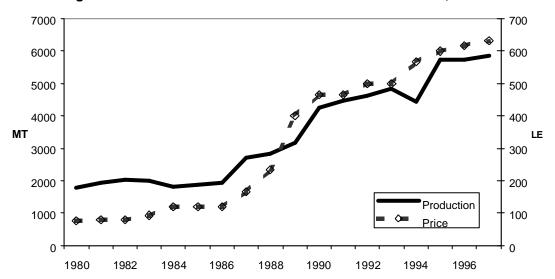


Figure 2.1: Domestic Production and Procurement Prices, 1980-97

Figure 2.1: Domestic Production and Procurement Prices, 1980-97

2.2 Producer Response to 1987 Liberalization

Figure 2.1 displays the domestic wheat production and the procurement price for the period 1980-97. Prior to 1987, the Government of Egypt (GOE) was heavily involved in the wheat farming subsector. In that year, the GOE liberalized production choices for farmers, while yet maintaining restrictions in the marketing of the domestic wheat. The GOE has been making more effort to facilitate the delivery and enhance payment procedures by allowing mills, cooperatives, and PBDAC to receive production from farmers and paying them on a cash basis. Farmers may still prefer to sell to private traders in that the traders may provide credit, buy irregular quantities of wheat, pay immediately in cash, or offer higher prices and/or direct collection from farmers¹².

In an effort to assess if there has been a structural change in the production of wheat post-1987, a series of linear equations have been estimated. Time series of area, yield and production from 1980 to 1997 are independently regressed on a time index. The exercise serves not to explain the time path of these statistics but rather to capture any shocks or permanent shifts which may have altered the growth patterns of area, yield or production. For these purposes, an indicator variable for the post-1987 period and a term capturing the interaction between the indicator and the time index have been added. The results from these estimations are summarized in Table 2.4.

¹²Mehanna, Hopkins, and Abdel Maksoud, 1994, cited in Badiane et al. 1998.

The primary objective here is to understand the large production increase of the post-1987 period as shown in Figure 2.1. Immediately, we must comment that the estimated coefficients should not be scrutinized too carefully for meaning. In none of the estimations with the time index variable, the post-reform indicator, and the interaction term are all three variables significant. Thus, the presence of the interaction term is skewing the coefficients on the other variables. We have displayed the results from twelve estimations specified with the time index, the interaction, and the POST87 indicator for the following point. The interpretation is that we cannot conclude that there have been any permanent structural changes in the growth relationship of the wheat production sector.

Table 2-4: Cultivated Area, Yield & Production, 1997

AREA = + POST87	_x TIME +	_ x TIME*POST87+ _	x
Egypt: b = 1424.6*	b1 = -35.1*	b2 = 151.2***	b3 = -907.3*
Upper: b = 367.1* 27.2***	b1 = -10.0**	b2 = 14.3**	b3 = -
Middle: b = 244.5* 150.9*	b1 = -4.8***	b2 = 24.7*	b3 = -
Lower: b = 812.9* 340.6*	b1 = -20.3***	b2 = 63.2*	b3 = -
AREA= + Egypt: b = 942.6*			
YIELD= + POST87	_x TIME +	_ x TIME*POST87+	x
Egypt: b = 8.80*	b1 = 0.28*	b2 = -0.04***	b3 = 2.49*
Upper: b = 7.41* 0.62***	b1 = 0.31*	b2 = 0.17***	b3 =
Middle: b = 8.67*	b1 = 0.34*	b2 = -0.05***	b3 = 3.64*
Lower: b = 9.47* 1.32***	b1 = 0.25**	b2 = 0.09***	b3 =
YIELD= + Egypt: b = 8.94*			
PRODUCE = + POST87	x TIME +	x TIME*POST87+ _	x
Egypt: b = 12,667*	b1 = 14.94***	b2 = 2,138*	b3 = -11,150*
Upper: b = 2,760* 315***	b1 = 17.02***	b2 = 234*	b3 = -
Middle: b = 2,139*	b1 = 28.37***	b2 = 404*	b3 = -2,038*
Lower: b = 7,769* 4,669**	b1 = -30.44***	b2 = 1,021*	b3 = -
PRODUCE= + _ Egypt: b = 5850*	x TIME + b1 = 1719*		

Notes:

Units: Area - feddans, Yield - ardeb/feddan, Production - ardeb (*, ** , ***) denote (significance at the 1% level, significance at the 5% level,

In Table 2.4, we have also displayed results from a second series of estimations without the interaction term (the last equation in each block of Table 2.4). The new results do indeed show a significant positive shock to YIELD post-1987. The AREA and PRODUCE regressions do not have significant coefficients on the indicator variable for the post-1987 period. Thus, we can only conclude that the growth trend of yield was positively shocked by the reforms of 1987, but there is no statistical evidence for an increasing rate of growth.

Table 2-5: Decomposition of Wheat Production Cost, 1988-1997 LE/feddan (%of Total)

Year	Labor Cost	Animal Cost	Machinery Cost	Seeds	Fertilizers	Manure	General Expense	Total Variable Cost
1988	149.81 (.46)	4.25 (.01)	83.88 (.26)	21.91 (.07)	25.64 (.08)	17.20 (.05)	24.55 (.08)	327.24
1989	148.56 (.42)	4.64 (.01)	90.91 (.26)	26.54 (.08)	42.45 (.12)	17.40 (.05)	23.26 (.07)	353.76
1990	167.67 (.42)	4.90 (.01)	99.31 (.25)	34.59 (.09)	50.27 (.10)	19.10 (.05)	24.15 (.06)	399.99
1991	169.98 (.37)	5.20 (.01)	114.70 (.25)	44.40 (.10)	73.20 (.16)	20.50 (.04)	36.60 (.08)	464.58
1992	187.30 (.34)	4.10 (.01)	144.25 (.26)	54.50 (.10)	105.30 (.19)	19.80 (.04)	42.20 (.08)	557.48
1993	200.20 (.32)	6.50 (.01)	160.80 (.25)	57.80 (.09)	116.90 (.18)	27.90 (.04)	62.90 (.10)	633.00
1994	204.40 (.30)	6.50 (.01)	179.49 (.27)	58.20 (.09)	127.00 (.19)	30.70 (.05)	67.40 (.10)	673.69
1995	216.59 (.30)	5.00 (.01)	205.59 (.28)	61.10 (.08)	133.50 (.18)	31.20 (.04)	72.80 (.10)	725.78
1996	228.20 (.30)	5.00 (.01)	214.89 (.28)	64.30 (.08)	135.99 (.18)	40.40 (.05)	77.50 (.10)	766.28
1997	239.19 (.30)	7.09 (.01)	218.59 (.27)	71.80 (.09)	137.03 (.17)	42.10 (.05)	80.90 (.10)	796.70

Source: MALR.

2.3 Wheat Production Costs

Table 2.5 shows a decomposition of the total variable cost per feddan for wheat production for the year 1997. The following information can be gleaned from this table:

In 1997, labor and machinery costs accounted for 31% and 27% of total variable cost respectively. The labor percentage quoted is a significant decrease from the 46% of TVC reported in 1988. Machinery has consistently remained at the 25-28% level.

Table 2-6: Wheat Production Cost, 1988-97

Year	Variable Cost	Yield	Unit Cost
1988	327.24	12.54	26.09
1989	353.76	13.34	26.51
1990	399.99	14.02	28.53
1991	464.58	12.37	37.55
1992	557.48	14.88	37.46
1993	633.00	15.23	41.56
1994	673.69	14.56	46.27
1995	725.78	15.93	45.56
1996	766.28	16.49	46.47
1997	796.70	16.93	47.06

Source: Central Administration of Agricultural Economics, MALR.

Labor and machinery are followed in terms of importance in 1997 by fertilizer, general expenses, seeds, manure, and animal labor with 17%, 10%, 9%, 5%, and 1% of TVC respectively. The large decreases in labor cost over the period is largely captured by an increase in fertilizer cost as a percentage of TVC. The general cost included such items as canal cleaning, purification, and other miscellaneous items.

2.3.1 The Development of Wheat Total Variable Cost (TVC) and Average Cost (AC)

In this section, the data presented in Table 2.6 are utilized to assess growth trends in total variable cost and average cost. After which, the relationship between total variable cost (LE/feddan) and productivity will be assessed. The results from the linear statistical regressions are presented below:

Trend Model for Total Variable Cost:

$$TVC = 255.03 + 57.24 *TIME_t$$

 $(15.79)* (21.99)*$
 R -squared = 0.98 F-ratio = 483.88¹³

- (1) TVC have increased from LE 327.24/feddan in 1988 to nearly LE 796.70/feddan in 1997.
- (2) The annual increase in TVC is estimated at LE 57.24/feddan, equivalent to a 10.04% annual growth rate.

¹³ The asterisk (*) denotes significance at a 1% level.

Trend Model for Average Costs:

$$AC = 23.51 + 2.69 *TIME_t$$

 $(12.76)* (9.06)*$
R-squared = 0.91 F-ratio = 82.14

- (1) Average cost has increased from LE 26.09/Ardeb in 1988 to approximately LE 47.06/Ardeb in 1997.
- (2) The annual increase in average cost is estimated at LE 2.69/Ardeb, equivalent to an annual growth rate of 7%.

Total Variable Cost as a Function of Yield:

$$TVC = -897.49 + 100.30 *YIELD_{t}$$

$$(-3.60)* (6.02)*$$

$$R\text{-squared} = 0.82 \text{ F-ratio} = 36.30$$

- (1) The interpretation of yield as an explanatory variable for TVC should be made cautiously in that the statistical significance of yield is eliminated when a time index is included in the above equation.
- (2) However, any increases in variable costs that are associated with an increase in yield must be explained by a rise in fertilizer use. This result is conceptually consistent with the prior finding of a positive yield impact from the 1987 reforms.

In summary, there has been a rising use of fertilizer as a percentage of variable cost. Additionally, yield has driven a production increase shock following the 1987 reform. However, as Figure 2.2 depicts, the above upward cost trends cannot be considered without a concurrent understanding of prices. An analysis of the price trends of domestic Egyptian wheat has been examined in other papers as well as in other chapters of this report.

Figure 2.2: Production Cost and Prices Facing Producers, 1988-97

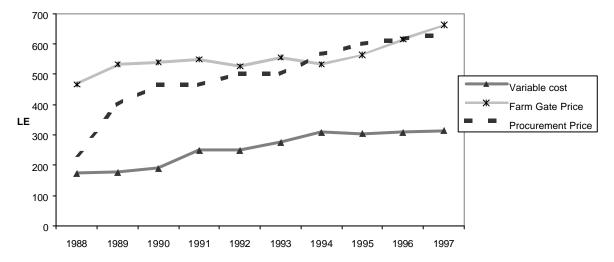


Figure 2.2: Production Cost and Prices Facing Producer, 1988-97

2.4 Farmer Choices In Marketing Wheat Production

In this section an attempt is made to characterize the choices made by farmers in producing, marketing (or not marketing), and consuming wheat. The descriptive statistics in this section are drawn exclusively from the *Producer Survey*.

The survey data suggest that Egyptian farmers grow wheat primarily to sell at harvest. However, this is not all-inclusive. In Lower and Upper Egypt, 46% and 54% of farmers surveyed stated that they rarely or never sell the wheat that they grow. Table 2.7 shows an average disposition of the 1997 and 1998 wheat harvests by region. Whereas Lower and Upper governorate farmers are selling less than half of their product, Urban and Frontier farmers sell nearly all of the crop. To understand this relationship, we analyzed the storage, transport, and consumption issues with regard to marketing wheat production.

Table 2-7: Disposition of Wheat Harvest, 1997 and 1998 Crops (averaged)

Region	Consum e	Animal Feed	Seed	Stored	Loss	Sell	Used as Rent	Pay Worker s	Gifts
Urban	12.45%	0.72%	0.05%	0.00%	0.00%	83.69%	0.00%	0.00%	3.09%
Lower	50.38%	1.40%	1.10%	0.17%	0.44%	35.98%	0.37%	4.36%	5.81%
Middle	19.61%	0.39%	1.14%	3.38%	0.00%	66.18%	0.03%	4.49%	4.78%
Upper	41.48%	0.00%	2.68%	7.55%	0.00%	41.61%	0.00%	0.50%	6.18%
Frontier	11.79%	1.35%	1.74%	0.00%	0.00%	81.28%	0.00%	0.74%	3.1%

Source: Calculated by the authors from June, 1998. IFPRI wheat producer survey data.

2.4.1 Farm Storage Across Regions

An analysis of on-farm storage as it relates to marketing choices must begin with an understanding of harvest patterns and storage capacity. Figures 2.3 and 2.4 are herein instructive.

100% 90% 80% 70% other 60% □jun 50% □may 40% 30% 20% 10% 0% urban lower middle upper frontier

Figure 2.3: Proportion of Wheat Sales in Harvest Season, 1997

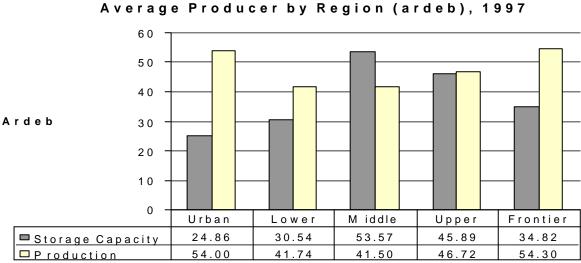


Figure 2.4: W heat Storage Capacity for an Average Producer by Region (ardeb), 1997

Figure 2.3: Proportion of Wheat Sales in Harvest Season, 1997

Figure 2.4: Wheat Storage Capacity for an Average Producer by Region (ardeb), 1997

producers, it is Urban and Frontier farmers who sell the largest proportions of their crop.

This result is intuitive from these results as well. Urban and Frontier states have the most defined harvest season (May-June). Farmers in Urban and Frontier Egypt also report the lowest storage capacity as a percentage of their production, reinforcing the need for them to sell the majority of their crop upon harvest. On the other extreme, Upper Egypt has a wheat harvest which is drawn across many months. Additionally, the farmers surveyed in Upper Egypt report a larger storage capacity than in all other regions except Middle Egypt. When farmers were asked whether they store more wheat after a good crop year, only 13% of all farmers surveyed responded positively. However, in Upper Egypt, 26%, or double the national average, responded that they do store more if they have had a high yield production year. A generalized conclusion can be drawn that although all wheat producers are price takers, it seems that Middle and Upper Egyptian farmers are faced with more options with regard to the disposition of their wheat. An alternative viewpoint may be that there are more reasons in place for Urban and Frontier farmers to sell the majority of their production.

2.4.2 Farm Storage Patterns

The use of storage capacity or, more simply, the quantity of wheat stored in a given month, is highly homogenous across regions. As shown in Figure 2.5, all regions follow a pattern of slow utilization of stored wheat characteristic of storing for household use rather than for marketing advantage.

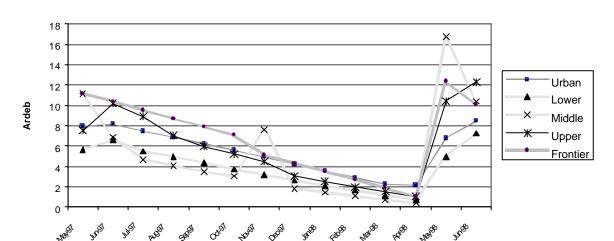


Figure 2.5: Average Wheat Stored by Producer by Region (ardeb)

Figure 2.5: Average Wheat Stored by Producer by region (ardeb)

Figure 2.6: Transportation Mechanisms for Off-Farm Sale of Wheat, 1997

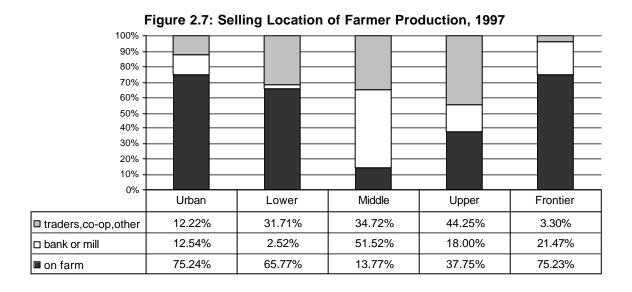


Figure 2.6: Transportation Mechanisms for Off-Farm Sale of Wheat, 1997

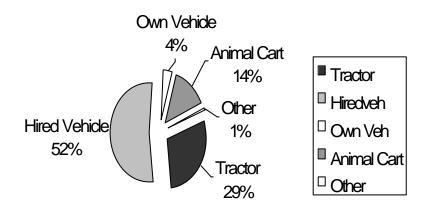


Figure 2.7: Selling Location of Farmer Production, 1997

2.4.3 Transportation

An analysis of the role of transportation in farmer marketing decisions begins with a breakdown of the forms of transportation. A majority of farmers who arrange their own transportation do so with hired vehicles (Figure 2.6). All regions appeared to have access to this form of transportation.

Figure 2.7 illustrates regional differences in the location of selling point. This information cannot be used to infer distinct relationships among the buyers and sellers since it does not identify the on-farm purchasers. However, the information does suggest that transportation is minimally used at this time by Urban and Frontier farmers and more substantially used by Lower, Middle and Upper Egyptian wheat producers. The average distance to selling point, Table 2.8, reflects this observation although the distance variation is not great.

Table 2-8: Average Distance To Selling Point (kilometers)

Region	Urban	Lower	Middle Upper		Frontier
Distance	1.26	2.34	2.76	2.36	1.68

Source: Calculated by the authors from June, 1998. IFPRI wheat producer survey data.

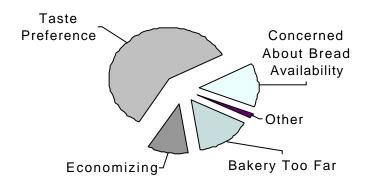
Referring back to Table 2.2, one could note that location accounted for approximately 20% of farmers' reasons for choosing a market outlet. In some instances, the farmer may indeed choose to market production in a different location if improved or lower cost access to transportation were facilitated.

2.4.4 Producer Consumption of Breads

The final descriptive consideration of farmers' marketing choices involves their consumption patterns. Nationally, farmers retained for own-consumption an average of 27% to 36% of their annual production in 1997 and 1998, according to the *IFPRI Producer Survey*. The percentage of wheat retained for consumptionreflected in this *Survey* is considerably lower than results from other estimates. When asked why they choose to keep portions of their crop rather than to purchase baladi bread, fino bread or flour on the market, 59% of them responded that they had a taste preference for foods processed in the household. This is depicted in Figure 2.8.

Figure 2.8: Why Egyptians Do Not Sell More Wheat and Buy Bread

Figure 2.8: Why Egyptians Do Not Sell More Wheat And Buy Bread



To complete this discussion of marketing decisions chosen by Egyptian wheat farmers, a series of two graphs of the monthly LE spent by producers on baladi and fino bread. The discussion of the fino versus baladi bread as demand substitutes is covered in the consumption chapter. However, the steady consumption of baladi bread in urban areas is effectively highlighted. Visually, there are two trend lines across all regions. During the harvest months, producers do purchase less prepared bread. For the rest of the year, it appears that they are able to maintain a steady line of purchasing while using stored wheat as depicted in Figure 2.5. There does appear to be a jump in April toward purchasing more bread, possibly concurrent with the exhaustion of stored wheat.

Figure 2.9: Average Monthly LE Spent by Wheat Producers on Baladi Bread, 1997

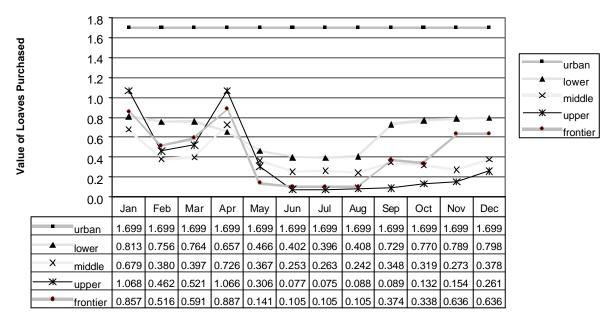


Figure 2.9: Average Monthly LE Spent by Wheat Producers on Baladi Bread, 1997 Figure 2.10: Average Monthly LE Spent by Wheat Producers on Fino Bread, 1997

2.5 Supply Response

This section is divided into two parts. In the first subsection, a supply response estimation will be presented. The latter subsection offers a suggestion for refinement on the supply response estimation if additional data were to become available.

2.5.1 Supply Response Estimation

An estimation of the supply-response function for wheat must take into consideration the most important factors which are believed to affect the domestically produced quantities of wheat. The variables which were originally included in the estimation process are: lagged wheat production in thousand tons, lagged wheat cultivated area in thousand feddans, average real prices of chemical fertilizers in LE/ton, farm level price of wheat in LE/ton, farm level price of fava beans in LE/ton, and

0.9 0.8 Value of Loaves Purchased 0.7 0.6 urban lower 0.5 middle 0.4 upper 0.3 0.2 0.1 0.0 Jan Feb Mar Apr May Jun Aug Sep Oct Nov Dec 0.619 0.619 0.619 0.619 0.605 0.505 0.505 0.505 0.538 0.619 0.619 0.619 urban 0.849 0.796 0.817 0.820 0.489 0.409 0.403 0.416 0.759 0.772 0.785 0.832 lower 0.588 0.564 0.554 0.503 0.472 0.403 0.393 0.409 0.502 0.566 middle 0.571 0.582 0.685 0.427 0.427 0.419 | 0.202 | 0.202 | 0.202 | 0.217 | 0.563 0.685 0.683 0.685

Figure 2.10: Average Monthly LE Spent by Wheat Producers on Fino Bread, 1997

the ratio of farm-level prices of what to fava beans ¹⁴. Stepwise least squares analysis was utilized in performing the estimation process for the period 1980-96.¹⁵ The model that best represents this supply relationship is also perhaps the simplest. The resulting equation is as follows:

Qwheat_t = -902.94 + 1.85 LagArea_{t-1} + 3.45 PWheat_t
(-2.33)**
$$(5.79)$$
* (5.29) *¹⁶

where Qwheat represents wheat production in thousand tons; LagArea is thousand feddans cultivated in the prior period; and PWheat is the farm leve price of wheat in LE/ton.

This linear model finds that lagged wheat cultivated area and wheat farm-level price are significant in determining the domestic supply of wheat. Together these variables explain 95% of the variation in wheat domestic supplied quantities.

2.5.2 Supply Response Revisited

The framework for a subsequent estimation of the supply response will be suggested. Given that the *Producer Survey* has provided cross-sectional data on the 1997 and 1998 production of wheat, a supply response estimation should capture the valuable information inherent in this database. However, an analysis of solely the *Survey* data would be deficient. Eight hundred farmers were surveyed for information regarding both the 1997 and the 1998 harvest seasons; yet, the price variation between the years was minimal. (As shown previously, the price variation across regions varied very slightly during this period as well.) Thus, the adaptation of producers following national price level changes of wheat would be incomplete.

We suggest using a two equation approach. The first equation would identify a relationship between area cultivated in wheat and the prices of wheat and berseem. The data for this estimation should be time series data from 1980-1997 on a national level. The coefficients derived from this time series analysis can be utilized to estimate a percentage increase in area cultivated for wheat with respect to a change in prices in the market.

¹⁴ Data for above-mentioned variables were obtained from the Ministry of Agriculture and Land Reclamation (MALR), along with the Central Authority for Public Mobilization and Statistics (CAPMAS). MALR stopped publishing data for clover (*berseem*) prices since 1986. Accordingly, *berseem* prices could not be included as an explanatory variable in any of the above trials.

¹⁵ The year 1997 was excluded from the analysis because data on some of the above variables could not be obtained for this year.

¹⁶ (*) indicates significance at the 5% level; (**) indicated significance at the 10% level.

A second equation would estimate yield as a function of farm-specific responses from the *Producer Survey*. The observations in the yield equation must take area as a fixed, exogenous variable for each year analyzed. The area response to price level changes from the first equation can be thus be utilized in concert with the yield equation to calculate expected supply response from exogenous changes in the price of wheat. This procedure would result in an output response encompassing producer adaptation both to reasons to increase the yield of wheat and to reasons to plant wheat.

3. WHEAT IMPORTS

3.1 Quantities of Imports

Egypt is one of the world's largest importers of wheat and currently imports a bit over half of its wheat. Table 3-1 provides a time series of wheat and flour import quantities since 1980. Wheat imports for 1998 are about 50 percent higher than those for 1980. Flour imports were important in the past but have essentially gone to zero in recent years.

Table 3-1: Wheat and Flour Imports, 1980-98

(million MT)

		(IIIIIIOII IVII)		
Year	Wheat	Flour		
1980	4.34	1.25		
1981	4.23	1.12		
1982	4.16	2.04		
1983	4.87	2.05		
1984	4.51	2.42		
1985	4.52	1.74		
1986	4.70	1.52		
1987	4.94	1.39		
1988	5.12	1.20		
1989	5.74	1.39		
1990	6.28	1.03		
1991	5.04	0.36		
1992	4.94	0.40		
1993	4.86	0.89		
1994	6.36	0.11		
1995	5.97	0.22		
1996	6.33	0.04		
1997	6.25	0.04		
1998	6.68*			

Source: Personal communication Dr. Ali Abdel Rahman, MTS.

Table 3-2 provides the distribution of wheat imports for the past four years by type of importer. GASC is clearly the largest importer with its share of total imports ranging from 77 to 87 percent. AID imports consistently are less than 2 percent of the total. Private sector imports have been more or less constant in percentage terms at about 13 percent of the total. Holding company imports reached a high of 18 percent of the total in 1996 and fell to about 10 percent of the total in 1997 and 1998.

Table 3-2: Distribution of Wheat Imports

^{*}Through November 1998.

	1995	1996	1997	1998
GASC wheat imports in 1000 tons	4565.9	4595.4	4768.0	5210.0
GASC wheat imports as a % of total imports	76.5%	70.2%	76.3%	87%
AID wheat imports in 1000 tons	100.0	114.8	113.0	98.7
AID wheat imports as a % of total imports	1.7%	1.8%	1.8%	1.5%
Private sector wheat imports in 1000 tons	726.1	778.7	732.4	751.9
Private sector imports as % of total imports	12.2%	11.9%	11.7%	11.3%
Holding company wheat imports in 1000 tons	573.7	1058.3	632.6	621.3
Holding company imports as % of total imports	9.6%	16.2%	10.1%	9.3%
Total wheat imports in 1000 tons	5965.7	6547.2	6246.0	6681.9

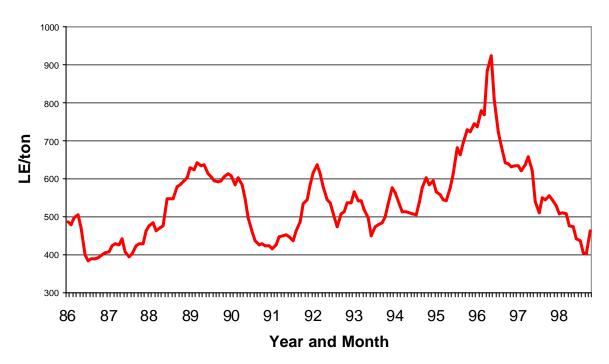
Source: Personal communication Dr. Ali Abdel Rahman, MTS.

3.2 Wheat world market prices

Because of data limitations, we do not have a long historical series of CIF wheat prices for Egypt. However, we constructed a series of prices based upon world prices as represented by the U.S. Gulf FOB wheat price. To create this series, we used a constant freight cost of \$10/MT and a constant exchange rate of LE3.4/\$. Clearly, neither of these assumptions are accurate for this entire time period. However, the resulting series does give us an indication of the variability in world wheat markets between 1986 and 1998. In a sense, the resulting series tells us what the landed price would have been if current shipping costs and exchange rate had been in effect over this time period. Figure 3-1 depicts this time series of simulated world wheat price landed in Egypt over this period. As is evident from the figure, simulated Egyptian CIF prices have ranged from a bit less than LE 400/MT to more than LE 900. This kind of variability in world market prices is not uncommon. There are reasons to believe that future world prices will be even more volatile than those in the past.

Figure 3.1: Simulated Egypt CIF Price

Simulated Egypt CIF Price



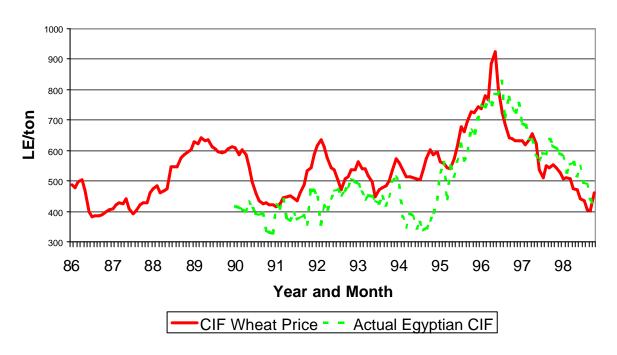
3.3 Comparison of Simulated and Reported Border Prices

Clearly recent simulated CIF prices are much closer to the actual CIF values than the earlier figures mainly because the exchange rate and freight costs in recent years have been close to the values used in the simulation. The monthly average simulated Egyptian CIF wheat prices for 1997 and 1998 are LE578 and 462 respectively. These prices can be compared to the border prices reported by CAPMAS of LE621 and 512 for 1997 and 1998 respectively. The CAPMAS border price is 7.4 percent higher than the simulated price for 1997, and 10.8 percent higher for 1998. Figure 3-2 contains a comparison of the simulated prices (Figure 3-1) with the reported CAPMAS border prices. The CAPMAS prices are considerably lower than the simulated prices for most of 1994, and somewhat lower before that. This difference is mainly because the export enhancement (US) and export restitution (EU) programs were in effect in 1994and earlier. Therefore, purchase prices could be considerably below market prices with the difference being the bonus or restitution payment. In 1995 and through mid-1996, the CAPMAS reported prices were generally similar to or slightly below the simulated world prices. Then from mid-1996 through 1998, the CAPMAS prices were generally higher than the simulated world prices. Although the differences are not huge, the fact that Egyptian prices paid have generally been higher than simulated Egyptian CIF prices merits further examination. At first brush, it certainly does not support the hypothesis (for the past two years at least) that Egypt has been able to buy at better than world market prices.

Figure 3.2: Comparison of Actual and Simulated CIF Prices

Figure 3-2

Comparison of Actual and Simulated CIF Prices



3.4 Wheat Protection

The actual tariff on wheat at present is 1 percent. However, the actual protection is higher because of the way markets are controlled, and domestic wheat is kept separate from imported wheat. According to IFPRI's calculations of nominal protection coefficients, wheat was actually taxed for the first five years of the 1990s. While we don't have precise figures, that taxation certainly continued in 1996 as world wheat prices shot up to very high levels. However, in 1997 and 1998, world wheat prices have fallen precipitously such that Egyptian wheat is now protected at a rate of about 23 percent (October 1998). That protection rate is calculated at the theoretical point of competition between imported and domestic wheat, a prototypical mill located in the Cairo region. For the calculation, we begin with the October 1998 Egypt CIF price of 462. To that we add LE 75 for port charges and transport to the mill, which yields a mill level import cost of LE 537. For domestic wheat, we start with the procurement price of 633 and add a transport and handling cost of 30 to arrive at a mill level cost of LE 663. The ratio of the mill level domestic grain cost to the imported grain cost is 1.23, implying a nominal protection of 23 percent. That rate of protection, of course, will vary with the world market price. It also would change if the procurement price changed.

3.5 Import Infrastructure

Egypt has adequate port capacity to handle expeditiously even peak import periods for wheat. There is adequate capacity to handle the 50,000 ton boats which offer lower transportation costs than smaller boats. There is also adequate grain handling and storage capacity in the port areas. All the millers with whom we spoke, both public and private, indicated no problems with the import infrastructure for wheat.

3.6 Import Losses

It was reported to us by one source that import losses in the system were quite high, as much as 15 percent. That would be a very high level of losses indeed. For domestic wheat, harvest and storage losses around 15 percent are not uncommon in developing nations. However, it is difficult to believe that storage and transport losses could be anywhere near that level for imported grain.

Given that imported grain is now much cheaper than domestic grain, there is a potential profit from leakage from the import system to the domestic grain system. As one might expect, most of the government officials did not believe it could happen. However, one of the private millers we interviewed told us he had heard of it happening by other private importers. Clearly we do not have strong evidence either way. However, we believe that leakage around the control system is much more likely than physical losses anywhere near 15 percent.

4. WHEAT TRANSFORMATION AND DISTRIBUTION

4.1 Structure and Organization of the Sector¹⁷

This section covers the wheat milling industry. The industry can be divided into three major components: public mills, private industrial mills, and village mills. The sector also can be classified according the three products produced: 72% fino flour, 82% flour for making baladi bread, and whole wheat flour produced by village mills. We will use both methods of classification in the discussion that follows. After the description of the various components of the sector, we will also cover issues related to transportation and storage of grain and flour.

4.1.1 Public Sector Mills

As of 1993, the public sector mills were organized into two holding companies: The Holding Company for Rice and Wheat Mills (HCRWM) and the Food Industries Holding Company (FIHC). Table 4-1 provides the structure and organization of the 131 mills owned by the two holding companies. These mills have a total capacity of 21, 763 MT of wheat per day of which 15,713 is assigned to baladi flour and 6,050 to fino flour. The HCRWM includes five companies with a total of 94 mills (12 fino and 81 baladi), and the FIHC consists of two companies and 37 mills (7 fino and 28 baladi). The percentage private shares of the companies ranges from 40 to 61, but they are all still effectively controlled by the public sector holding companies.

Under current regulations mills may only produce one type of flour, so a mill must be baladi or fino and cannot be a combination of the two. The same rule applies to private sector mills. Between 1993 and 1997 some of the public fino mills were rented to private sector companies to produce fino flour. By the end of 1997, however, this practice had ended as privately owned capacity expanded significantly.

4.1.2 Private Industrial Mills

From Table 4-1, we saw that the total public sector fino milling capacity was 6,050 MT per day. Table 4-2 provides the projected private milling capacity through 1999, which sums to 6,670 MT per day. Thus, the combined public and private sector capacity for fino flour is 12,720 MT/day. Assuming 26 working days per month and 72% extraction rate, this milling capacity can produce 238,118 MT per month of fino flour. Projected peak demand for 1999 (September through April) is 135,000 MT per month. It likely will be about 25,000 MT per month less the rest of the year. Hence, in 1999, production capacity for fino flour from both the public and private mills will be about twice demand. Demand will grow in future years, but even by 2002 the capacity is expected to exceed demand by a considerable margin.

¹⁷This section draws heavily upon Kherallah et al. 1998. Much greater detail on many of the topics covered here is included in that document.

Table 4-1: Structure and Organization of Holding Companies' Wheat Mills, Early 1998

	Geographic Distribution	Percent private	Tota	al number of 1	nills	Total milling capacity (mt of wheat grain/day)**			
	of mills	shares	Fino mills	Baladi mills	All mills	Fino mills	Baladi mills	All mills	
HCRWM									
Alexandria Flour Mills	Alexandria, Beheira	40	2	14*	16*	750	1,845	2,595	
East Delta Flour Mills	Sharkia, Dakahlia, Damietta, Port Said, Ismailia, Suez, N. & S. Sinai	61	1	17*	18*	500	2,325	2,825	
Middle & West Delta Flour Mills	Gharbia, Menoufia, Qalubia, Beheira, Kafr El Sheikh	61	4	14	18	1,200	2,520	3,720	
South Cairo Flour Mills	Cairo, Giza	40	2	16	18	750	1,517	2,267	
Upper Egypt Flour Mills	Sohag, Qena, Aswan, the Red Sea	61	3	21	24	600	3,066	3,666	
Total			12	81	94	3,800	11,273	15,07 3	
FIHC									
Middle Egypt Flour Mills	Fayoum, Beni Suef, Minia, Assiut, New Valley	41	3	20*	23*	600	2,470	3,070	
North Cairo Flour Mills	Cairo, Qalubia	41	4	10*	14*	1,650	1,970	2.700	
Total			7	28	37	2,250	4,440	3,590	
Grand Total			19	109	131	6,050	15,713	6,660	
								21,76 3	

Source: Kherallah et al. 1998, p.6.

* Total number of mills includes mills that are currently off production for renovation and upgrading.

** Total capacity excludes mills that are not currently operating because their capacity is being upgraded.

Table 4-2: Privately Owned Fino Flour Mills

Name of Mill	Location	Capacity (mt/day)
Operating at the end of 1997		
Wadi El Nil	Borg El Arab	500
Egyptian Millers	6 th October	500
6 th October for Mills and Develop (Al Badry)	6 th October	150
Dahab Flour Mill Company	6 th October	250
Delta Bakeries and Flour Mills Company	10 th Ramadan	500
El Aseel Flour Mill	Dakahlia	160
Al Ettehad Flour Mill	Sharkia	150
Edrees	Qalubia	250
Abdel Malek Mills	Qalubia	50
Total for 1997		2,510
Projected to operate in 1998		
Flour Land	6 th October	300
October 6 th for Mills and Marketing (Bebawi)	6 th October	500
Five Stars Flour Mills (ETM Shorbagi)	Suez	450
Al Safa for Grains and Its Products (Al-Murshedi)	Badr City	500
Sadat City Flour Mills (Ahmed Osman)	Sadat City	500
Imad Shalaby	Suez	100
Abed	Gharbia	60
Beshai	Assiut	60
Al Ekhwa El Arab	10 th Ramadan	350
Total for 1998		2,820
Uncertain		
Middle East Flour Mills	10 th Ramadan	900
Al Akhal Flour Mills	6 th October	140
Al Rafedain Flour Mill	6 th October	100
International Arabic Company Mill	6 th October	100
El Nil for Food Industry	Sadat City	100
Total uncertain		1,340
Grand Total (potential)		6,670

Source: Kherallah et al. 1998, p.115.

Private mills also produce baladi flour under contract to the government. About 86 percent of the baladi flour is produced by public mills and 14 percent by private mills. Table 4-3 shows the region and public/private breakdown of baladi flour production.

Table 4-3: Total and Percentage Public and Private Contribution to Total Production of Baladi Flour by Region, 1996/97

	Public Mills				Contracted Pri	Public and Private		
	Total Quantity	Cor	ntribution	Total Quantity	Contribution		Total Quantity	Public & Private Contribution to
		To the Region ^a	to All Public Mills ^b		to the Region ^c	to All Contracted Privates Mills ^d		Total Quantity
	(mt)	(p	percent)	(mt)	(percent)		(mt)	(percent)
North Cairo	588,747	93.4	11.9	41,785	6.6	5.1	630,532	10.9
South Cairo/Giza	497,698	58.6	10.0	351,900	41.4	43.3	849,598	14.7
Alexandria	416,016	100.0	8.4	0	0.0	0.0	416,016	7.2
Middle & Western Delta	784,077	76.4	15.8	241,961	23.6	29.8	1,026,038	17.8
Eastern Delta	900,622	95.1	18.2	46,212	4.9	5.7	946,834	16.4
Middle Egypt	776,903	91.0	15.7	76,424	9.0	9.4	853,327	14.8
Upper Egypt	993,902	94.9	20.0	53,626	5.1	6.6	1,047,528	18.2
Public & private total	4,957,965	85.9	100.0	811,908	14.1	100.0	5,769,873	100.0

Source: Grain Industries Chamber-Egyptian Industries Union (Kherallah et al. 1998, p. 12).

^a Calculated as the percentage ratio of total quantity of public milling companies (column 1) to regional total quantity of public and private mills (column 7).

^b Calculated as the percentage ratio of each related cell in column 1 to the last cell in that column.

^c Calculated as the percentage ratio of total quantity of contracted private mills (column 4) to column 7.

^d Calculated as the percentage ratio of each related cell in column 4 to the last cell in that column.

4.1.3 Private Village Mills

The final category of mills is the small village mills that usually mill wheat for a fee. Farmers typically bring their flour to the mill, have it ground, and return with the flour from their own wheat. Some of the mills have sifters, but many do not. However, even if the farmer takes whole wheat flour from the mill, there is often sifting done by hand in the home to produce a finer flour corresponding to the tastes of each family. It is not accurate to say that just because the mill may produce nearly 100 percent extraction flour, the flour is actually consumed that way. After sifting either at home or at the mill, the bran is normally used as animal feed on the farm.

Most of the village mills range from 1 to 50 MT per day. Table 4-4 provides the geographical distribution of the 5,259 private village mills as of 1996.

4.2 Milling Technology

There are three types of mills operating in Egypt: stone mills, old cylinder technology, and new cylinder technology. The village mills are stone mills as are some of the public industrial mills. Cylinder technology permits production of a finer higher quality flour. The 131 public sector mills are about half stone technology and half cylinder. Most of the fino flour mills, public or private, use the new cylinder technology.

4.3 Flour Types

As mentioned above, there are three distinct flour types and markets in Egypt: 72% fino flour, 82% baladi flour, and village milled whole wheat flour. Figure 4-1 summarizes the flow of wheat into the different marketing channels. We will now cover each of the channels separately.

4.3.1 72% Fino Flour

The production and trade in fino flour is almost free of government intervention today. Producers of fino flour must use only imported grain. However, trade in imported grain is not permitted. Importers of grain must either own or rent a mill and use the imported grain in that mill. Imported grain cannot be traded on local markets. Imports for the public sector mills are handled at the level of the holding company to capture economies of scale in importing. Private mills sometimes work together on imports to capture these same economies of scale. The public sector mills usually use public companies to handle the importing logistics and transportation.

Sale and distribution of fino flour is not regulated. Because of the excess capacity that exists today in fino flour milling, there is unusually stiff competition between and among public and private sector mills. Many firms attempt to establish contractual relationships with supermarkets, bakeries, etc.

Table 4-4: Geographical Distribution of Private Village Mills in 1996

Governorate	Number
Giza	126
Qalubia	150
Menoufia	314
Gharbia	352
Kafr El-Sheikh	353
Beheira	330
Alexandria	8
Matruh	4
Sharkia	664
Dakahlia	575
Damietta	56
Ismailia	34
Suez	3
Fayoum	135
Beni-Suef	405
Minia	421
Assuit	198
New Valley	38
Sohag	337
Qena	670
Aswan	86
Total	5,259

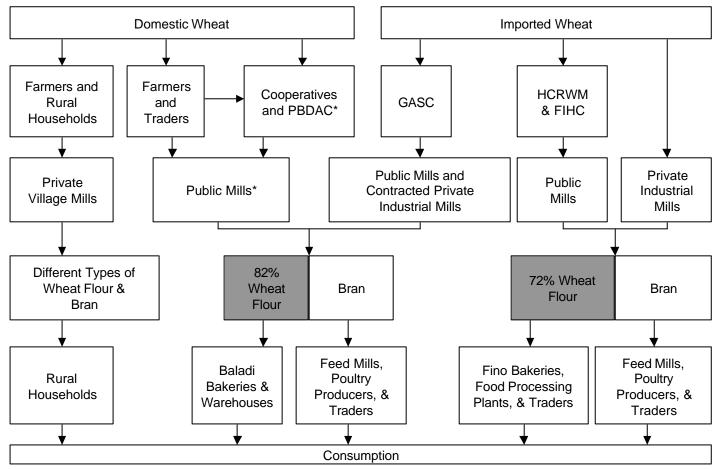
Source: Ministry of Trade and Supply, unpublished data, 1996 (Kherallah et al. 1998, p. 116).

4.3.2 82% Baladi Flour

Figure 4-2 provides a subsector map of the 82% baladi flour sector in terms of the quantity flow. As is clear from the figure, about 6 million MT of wheat goes into this system, of which about 1.2 million MT is domestic and 4.8 million MT imported. Public mills handle about 5.06 million MT and private mills on contract about 0.94 million MT. About 4.92 million MT of 82% flour is produced, of which 3.31 million MT goes to urban areas (2.95 to bakeries and 0.36 million MT to flour stores) and 1.61 million MT to rural areas (0.65 million MT to bakeries and 0.96 million MT to flour stores). In rural areas there is a stronger preference to bake bread in the home, and the opposite is true in urban areas.

Figure 4.1: Wheat Milling Marketing Channels

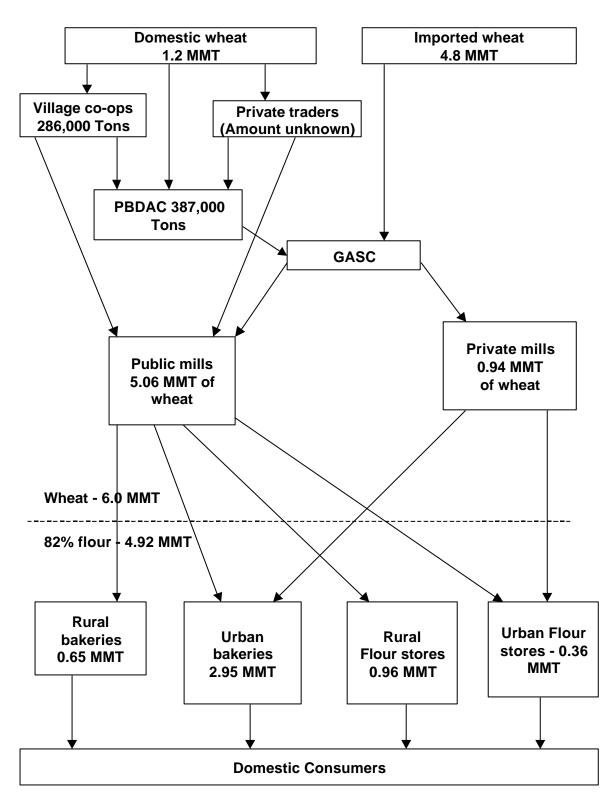
Figure 4-1 - Wheat milling marketing channels



^{*}PBDAC and the public mills collect the wheat from farmers and traders on GASC's behalf; GASC allocates funds to each of these institutions to pay the procurement price to farmers and traders.

Figure 4.2: Subsector Map of 82% Flour Component (Quantity of Product Flow)

Figure 4-2 - Sub-sector map of 82% flour component (Quantity of product flow)



The system for baladi flour is managed by GASC. It sells wheat to mills at a price which varies according to mill ownership, technology, and age of the mill. The average selling price is around LE 446 per ton, considerably less than the 1997 procurement price of LE 640. The mills then sell the baladi flour for 500 and the bran at a price fixed by the government. The net of all these calculations is a milling fee that ranges between LE 30 and 46 per ton for public mills and between LE 25 and 35 for contracted private millers. GASC also pays transport costs incurred by the millers.

Table 4-5 provides the 1997 regional distribution of baladi flour to bakeries and flour stores. Baladi flour represents about half of the total flour consumed in Egypt, with fino representing about 15 percent and rural direct consumption the rest.

4.3.3 Rural Village Flour

Village mills charge about LE 42 per MT to mill wheat. Some of the larger village mills (10 to 50 MT per day) accept payment in kind instead of cash. In other words, the mills keep a portion of the farmer's flour in compensation for the milling. About 4 million MT goes through this village milling system each year.

4.4 Economic Conditions in the Wheat Milling Sector

Table 4-6 contains the estimated per-unit milling fees and profit margins for different types of mills and kinds of flour produced. The profit margin is the estimated milling fee minus estimated operating costs. Fino flour clearly has been much more profitable than baladi flour or flour produced in village mills. It should be noted that these are operating margins and not overall profitability including return on investment or depreciation. Table 4-7 contains the breakdown of operating costs by cost category. Labor represents the largest cost component for all mill types, but it is significantly lower for contracted private mills.

IFPRI also did a preliminary analysis of economies of scale in milling operations. Their analysis reached the expected conclusions that there are economies with respect to size of mill and capacity utilization of the mill. They also examined other variables such as mill location and ownership. While the regression did not explain much of the total variance of the relationship, the variables tested were significant and of the correct sign.

4.4.1 Transportation

Since much of the grain used in milling is imported, truck transportation is very important in getting wheat from the ports to the mills. The average milling company has a fleet of over 140 trucks. However, most of the grain is moved by the public transport company (PCSS) or by private transport contractors. In the IFPRI survey, 22 to 24 percent of the respondents indicated restrictions on moving

¹⁸Actually the mills sell the flour to bakeries for 290 and receive 210 from GASC. They sell it to flour stores for 500, so their revenue is 500 either way. Also, the rules on selling bran at the fixed government price appear not to be enforced, and market prices recently have been higher than the fixed government price.

grain or flour, which hampered their operations.

Table 4-5: Regional Distribution of Baladi Flour to Different Outlets in 1997

	Bakeries				Warehouses			
Region	Total Quantity	Number of Bakeries	Distribution to Bakeries Within Region ^a	Regional Distribution of Bakeries ^b	Total Quantity	Number of Warehouses	Distribution to Warehouses Within Region ^a	Regional Distribution of Warehouses ^b
	('000 mt)		(percent)		('000 mt)		(percent)	
North Cairo	819.4	1,480	100.0	23.9	0.0	0	0.0	0.0
South Cairo/Giza	335.6	754	79.8	9.8	85.0	1,842	20.2	6.8
Alexandria	314.7	943	94.8	9.2	17.3	405	5.2	1.4
Middle & West Delta	535.0	2,516	86.1	15.6	86.7	4,683	13.9	6.9
East Delta	658.4	2,170	71.7	19.2	259.9	1,508	28.3	20.7
Middle Egypt	499.7	1,841	69.0	14.6	224.4	2,980	31.0	17.9
Upper Egypt	241.7	989	29.3	7.1	582.0	9,578	70.7	46.4
Total	3,424.5	10,693	73.2	100.0	1,255.2	20,996	26.8	100.0

Source: The MOTS, unpublished data (Kherallah et al. 1998, p.45).

^a Calculated as the percentage ratio of total quantity of each outlet respectively to total quantity of both outlets.

^b Calculated as the percentage ratio of the related cells in the total quantity of each outlet to the last cell of that column.

Table 4-6: Price and Profit Margins by Flour Type and Mill Category, 1996. (Including Estimated Transport Costs)

	Price Margin	Profit Margin		
	(LE/mt)			
Baladi flour				
Public mills	42.4	18.4		
Law 159 mills	32.5	16.6		
Law 203 mills	46.7	19.2		
Old cylinder mills	42.1	23.8		
Modern cylinder mills	54.3	29.7		
Stone mills	39.2	13.2		
Large mills	41.1	29.9		
Medium mills	42.6	17.0		
Contracted private mills	25.5	10.4		
Large mills	27.8	13.2		
Other mills	24.7	9.6		
Fino flour				
Public mills	223.4	192.6		
Law 159 mills	228.2	200.3		
Law 203 mills	220.4	187.8		
Large mills	226.8	203.4		
Medium mills	215.7	168.4		
Raw flour				
Village mills	37.4	18.2		
Large mills	31.9	17.5		
Small mills	39.4	18.4		

Source: Kherallah et al. 1998, p. 98.

Table 4-7: Structure of Operating Costs by Mill Category, 1996

LE per MT of Processed Wheat Grain

	Public mills						Contracted	
	Under Lav	v 159*	Under La	w 203**	Al	11	Private Mills	
	Total costs	Percen t	Total costs	Percent	Total costs	Percent	Total costs	Percen t
Transport	0.16	0.94	0.14	0.51	0.15	0.62	1.65	10.97
Equipment & maintenance	2.06	12.10	4.53	16.35	3.73	15.32	1.43	9.51
Rent	0.02	0.12	0.01	0.04	0.01	0.04	0.23	1.53
Taxes & licenses	0.19	1.12	0.43	1.55	0.35	1.44	0.39	2.59
Labor	8.30	48.74	14.01	50.56	12.22	50.21	3.44	22.87
Energy &	2.93	17.20	4.23	15.27	3.83	15.74	4.89	32.51
communication	2.54	14.91	1.97	7.11	2.15	8.83	1.75	11.64
Bag costs	0.48	2.82	2.33	8.41	1.75	7.19	1.19	7.91
Finance	0.35	2.06	0.06	0.22	0.15	0.62	0.07	0.47
Other	17.03	2.00	27.71	0.22	24.34	0.02	15.04	0.47
Total	17.03		27.71		21.31		15.01	

	Private Village Mills						
	Sn	ıall	Very	Small	All		
	Total Costs	Percent	Total Costs	Percent	Total Costs	Percent	
Transport	0.00	0.00	0.00	0.00	0.00	0.00	
Equipment & maintenance	5.04	35.59	5.17	24.81	5.14	26.39	
	0.17	1.20	0.29	1.39	0.26	1.33	
Rent	1.03	7.27	1.32	6.33	1.24	6.37	
Taxes & licenses	3.93	27.75	6.22	29.85	5.69	29.21	
Labor	3.68	25.99	6.80	32.63	6.08	31.21	
Energy & communication	0.02	0.14	0.11	0.53	0.10	0.51	
Bag costs	0.22	1.55	0.60	2.88	0.70	3.59	
Finance	0.07	0.49	0.33	1.58	0.27	1.39	
Other	14.16		20.84		19.48		
Total							

Source: Kherallah et al. 1998, p. 86.

- * Under Law 159 refers to mills that belong to the milling companies that are 61 percent private, and therefore fall under Private Sector Law 159.
- ** Under Law 203 refers to mills that belong to the milling companies that are less than 50 percent private, and therefore fall under Public Enterprise Law 203.

Reported transport costs ranged from 4 piasters per ton km for public mils to 12 piasters per ton km for private contract mills. However, the public mill figures are not believed to be accurate because much of the transport cost is handled at the level of the holding company and not the individual mill.

4.4.2 Storage

Private mills producing fino flour typically have 30 to 40 days of storage capacity at the mill to handle the lumpiness of import shipments. For example, a 500 MT/day mill might have 20,000 MT of storage. These new mills usually have large steel silos for grain and warehouses for flour.

Storage for baladi mills tends to be much less, averaging 3 days for both public and contracted private mills. These mills depend more on timely delivery of grain by GASC or one of the transportation agencies.

Storage losses were reported in the IFPRI survey and are included in Table 4-8. Rodents and insects were the most frequently reported cause of storage losses.

4.5 Grain Marketing Systems ¹⁹

4.5.1 Grain Imports

Significant changes have occurred in the wheat marketing system since 1987 and particularly since 1992/93. The private sector can now import wheat to be milled into 72% flour and import flour directly. Import tariffs on wheat and flour are 1 and 5 percent respectively. For flour there are additional taxes and fees that serve to place a significant wedge between imported wheat and flour. Given that wedge, little or no flour is imported today.

Despite the fact that imports are now free, most of the wheat is still imported by GASC. Table 3-2 provided the wheat imports by importing entity for 1995-98. GASC has imported 76-87 percent of the total followed by private companies that imported 12-13 percent, but their share is expected to rise in the future.

GASC imports are used for making either fino or baladi flour. Most of the storage and transportation is handled by public entities. Private millers use either their own transport or contract with other firms or agencies.

4.5.2 Domestic Wheat

Significant changes also have occurred in domestic wheat marketing since the reforms in 1987. Farmers are no longer obligated to sell wheat to the government (although the obligation was not enforced previously). The government has attempted to increase the

¹⁹This section draws heavily upon Badiane et al. 1998.

Table 4-8: Wheat Grain Losses by Type of Mill Ownership, 1996

	Public Mill	Contracted Private Mill	Private Village Mill
Percent wheat stock loss per mill (mean)	0.69	0.55	0.30
(Median)	0.00	0.00	0.00
Main source of wheat loss (percentage based on mills with losses)			
Rodents	80.00	88.00	58.00
Insects	41.00	25.00	40.00
Transport	15.00	25.00	32.00
Handling	12.00	0.00	1.00
Other	2.00	40.00	1.00

Source: Kherallah et al. 1998, p. 69.

procurement price to be more in line with world prices. It has also changed payment procedures so that farmers can be paid in cash. Because of these and other changes, government procurement is now three times what it was in 1989.²⁰ In percentage terms, the procurement fraction went from 3.6 percent in 1985 to 18 percent in 1996. Still, however, most of the domestic wheat does not enter the official market chain and remains in rural areas for local consumption.

4.5.3 The Private Trading Sector

Since the market liberalization began around 1987, there has emerged an active trading sector for wheat. IFPRI surveyed a sample of 1,984 traders to obtain a profile of the trading sector. Table 4-9 contains the general characteristics of the traders surveyed by region. Most of the traders are male and they have on average of 12 years experience in trading wheat and flour.

Table 4-10 provides the income shares for major business activities of the traders. Clearly most of the traders' income does not come from wheat and flour. Half or more comes from trade in other grains and around a quarter from trade in other goods.

Tables 4-11 and 4-12 provide data on sources of wheat and flour purchases and kinds of customers to whom the traders sold wheat and flour. The traders bought 80 percent of their wheat from farmers and most of the rest from other traders. Most of their flour was purchased from other traders or public mills. At the time of this survey, private mills were just emerging as a major force in the wheat commercial system. The traders sold almost half their wheat to millers with the rest spread

²⁰Farmers can now obtain the procurement price directly from millers, from PBDAC, or from cooperatives.

fairly evenly among consumers, other traders, and other entities. Three-fourths of the traders' flour was sold to consumers and only 7 percent to bakeries.

Trader Transport. Table 4-13 provides data on the use of transportation equipment by traders. On average, over 90 percent of the traders use transportation, but 79 percent rent the equipment. There appears to be considerable variability among the governorates. Table 4-14 provides data on the type of transportation equipment used by region. Transport is predominantly truck except in the frontier governorates where 39 percent of the transport is by cart. Table 4-15 provides the cost of grain transport by region. The average cost per ton/km is LE 0.39, but the range is between LE 0.11 in Cairo to 0.60 in Upper Egypt.

Operating Costs. Table 4-16 summarizes the operating costs for the surveyed traders in 1995-96. The average marketing cost across all regions was LE 32 per MT. However, it was five times that amount in Cairo and twice that amount in Alexandria. The main reason for the high costs in these regions was the significantly higher labor costs. The raw data seem to evidence economies of scale so that unit costs are somewhat lower for larger traders. This would imply there may be some consolidation in the future. However, trading is an enterprise with low barriers to entry and relatively low capital costs, so new entrants are likely as well.

4.6 Price Linkages Among Local Wheat and Flour Markets

The IFPRI study conducted several kinds of analysis of monthly wheat prices across Egypt from 1976 through 1995.²¹ We will report here the most important conclusions from that analysis.

4.6.1 Price Instability

Price instability was compared between the pre-reform (1976-86) period and the post-reform period (1987-95) for several govenorates and for rural and urban areas in Egypt. In general, the results indicate that price instability was less in rural areas than in urban areas during both periods. Also, the results demonstrated that instability decreased following the reforms launched in 1987. Urban instability ranged 12-24 pre-reform and 14-19 post-reform. Rural instability moved from 10-15 pre-reform to 5-10 post-reform. These indicators are trend adjusted coefficients of variation. ²²

²¹This section draws upon material in Badiane et al. 1998. We also consulted Mendoza et al. 1998.

²²Badiane et al. 1998 p. 88.

Table 4-9: General Characteristics of Wheat Traders, 1996

Governorate	Type of	Businses 1	Expe	erience	Previous	Profession ²	Main O	ccupation	Mot	ivation	Male		Age of tl	ne Owne	r
Category	Whole- Sale	Retail	Wheat	Wheat Flour	Farmer	Trader	Trader	Farmer	Profit- Ability	Inheri- Tance	Traders	20- 30		41- 50	>50
	(per	cent)	(у	rrs)					(Pe	rcent)					
Cairo	50	30	12	6	1	83	96	3	35	63	97	4	9	37	50
Alexandria	52	19	9	13	12	62	88	8	45	50	99	3	25	42	29
Lower Egypt	44	27	12	14	36	24	66	16	77	16	97	5	23	39	33
Upper Egypt	50	37	12	9	34	36	70	14	65	29	99	3	21	38	39
Frontier Govs	6	91	5	9	40	22	90	5	70	9	100	20	28	31	21
Aggregate	45	33	12	12	33	32	71	14	69	24	98	5	22	38	35

Source: Badiane et al. 1998, p.48.

Note: percent refers to the percentage of respondents belonging to the corresponding category.

Table 4-10: Income Shares of Major Business Activities of the Traders, 1996

Governorate Category	Income Share in Major Business Activities, 1995-96							
	Wheat Flour		Other Grain	Other Trade				
	(percent)							
Cairo	16	9	60	15				
Alexandria Lower Egypt	16 20	10	52 46	22 25				
Lower Egypt Upper Egypt	26	3	48	23				
Frontier Govs	11	11	33	45				
Aggregate	21	7	47	25				

¹ The remaining respondents classify themselves as both wholesalers and retailers.

² The remaining respondents have been primarily employees and students, among different categories of previous professions.

Source: Badiane et al. 1998, p. 48.

Note: Percent refers to the percentage of respondents belonging to the corresponding category.

Table 4-11: Share of Wheat and Wheat Flour Purchased from Different Suppliers, 1996

(Percent)

		Wheat			Wheat Flour					
	Traders	Farmers	Others	Traders	Pub. Mills	Private Mills	Importers	Others		
Cairo	63	27	10	17	60	23	0	0		
Alexandria	41	58	1	48	3	27	22	0		
Lower Egypt	12	87	1	34	58	2	4	2		
Lower Egypt Upper Egypt	16	83	1	36	59	2	0	3		
Frontier Govs	87	13	0	92	8	0	0	0		
Aggregate	19	80	1	44	46	5	4	1		

Source: Badiane et al. 1998, p. 53.

Table 4-12: Share of Wheat and Wheat Flour Sold to Different Customers, 1996

(Percent)

Governorate		Wh	eat			Wheat	at Flour		
Category	Consumers	Traders	Millers	Others	Consumers	Traders	Bakeries	Others	
Cairo	34	61	5	0	77	13	9	1	
Alexandria	18	23	42	17	35	21	21	23	
Lower Egypt	14	12	55	19	80	13	6	1	
Upper Egypt	25	18	35	22	74	18	7	1	
Frontier Govs	87	0	5	8	96	2	2	0	
Aggregate	21	17	44	18	77	13	7	3	

Source: Badiane et al. 1998, p. 53.

Table 4-13: Access to and Use of Transport Services, 1996

Governorate Category	Use Trans for Ti	•	Own	nership of Vehicle Used			
	Yes No		Own*	Rent	Own & Rent		
	(perce	ent)	(% of respondents)				
Cairo	88.5	11.5	45(62)	48	7		
Alexandria	99.2	0.8	25(93)	70	5		
Lower Egypt	95.4	4.6	16(55)	80	4		
Upper Egypt	93.5	6.5	9(69)	84	7		
Frontier Govs	35.6	64.4	23(47)	67	10		
Aggregate	92.1	7.9	16(63)	79	5		

Source:Badiane et al. 1998, p. 59.

Table 4-14: Type and Use of Transport Services, 1996

		Method of transportation								
	Truck	Cart	Truck/cart	Others						
		(percent)								
Cairo	94.2	1.4	4.3	0						
Alexandria	99.2	0.8	0	0						
Lower Egypt	89.1	4.3	3.8	2.8						
Upper Egypt	78.1	7.7	9.0	5.2						
Frontier Govs	58.1	38.7	3.2	0						
Aggregate	85.7	5.7	5.2	3.4						

Source: Badiane et al. 1998, p. 59.

Note: The figures correspond to the percentage of respondents.

Table 4-15: Cost of Transport Services, 1996

Governorate Category	Distance Between Points of Purchase and Sale	Average Shipping Time	Average Quantity Transported	Average Cost per Shipment	Average Cost/ton/km
	(km)	(hrs)	(tons)	(LE)	
Cairo	71.34	2.29	4.39	35	0.11
Alexandria	65.40	2.06	5.53	62	0.17
Lower Egypt	18.94	1.46	3.71	27	0.38
Upper Egypt	12.82	1.32	2.61	20	0.60
Frontier Govs	34.30	1.11	4.67	58	0.36
Aggregate	20.66	1.45	3.39	27	0.39

^{*} Figures in parentheses are usage share of own vehicle in wheat trading.

Source: Badiane et al. 1998, p. 60.

Table 4-16: Structure of Operating Costs in the Marketing Sector, 1995/96

	Average* Quantity Purchased	Average Cost of Transport	Average Cost of Storage	Average Cost of Salaries	Other Operating Costs	Total	
	(ardeb)	(LE/ardeb)					
Cairo	363	1.20(5.8)	1.22(5.9)	16.31(79.1)	1.90(9.2)	20.63	
Alexandria	821	1.68(16.3)	0.40(3.9)	5.74(55.6)	2.50(23.5)	10.32	
Lower Egypt	1353	1.09(31.9)	0.34(9.9)	1.89(55.3)	0.10(2.9)	3.45	
Upper Egypt	1115	1.15(21.4)	0.22(4.1)	3.88(72.3)	0.12(2.2)	5.37	
Frontier Govs	761	1.86(29.0)	0.70(10.9)	3.62(56.5)	0.23(3.6)	6.41	
Aggregate	1175	1.19(24.6)	0.34(7.0)	3.12(64.5)	0.19(3.9)	4.84	

Source: Badiane et al. 1998, p. 66.

Numbers in the parentheses are percentage shares.

^{*}Averages per trader

4.6.2 Urban-Rural Price Spreads

The analysis of urban-rural price spreads was less conclusive. There was a periodic reversal of rural-urban price ratios (greater or less than 1) in much of the data. This reversal can be explained by reversal of trade flows, poor data, or segmented markets. The most likely cause is segmented markets. The segmentation occurs through government controls of grain movement and provision of grains through GASC.

Analysis was done on a number of urban pairs as well. In general, the 1987 liberalization did not lead to a reduction in these price spreads. The authors hypothesized that the reason was that the spreads pre-reform did not accurately reflect the true cost of moving grain across regions. A corollary would be that the post-reform spreads more accurately reflect that economic cost.

4.6.3 Co-integration Analysis

Finally, the IFPRI team conducted an analysis of the degree of co-integration of prices in different parts of Egypt. The analysis used the same monthly price series (1975-96) as was used for the other tests. The co-integration model used the Cairo market as the lead market (and tested for that assumption). Granger causality tests generally supported Cairo as the lead market. In general, the long-run multipliers were quite low, and the speed of adjustment often amounted to many months. Subsequent analysis covered many other city pairs in upper and lower Egypt. Similar conclusions on the degree of integration were reached.

In comparing pre-reform and post-reform periods, the authors conclude that wheat markets have become more interdependent post-reform. Multipliers tend to be much higher in the post-reform period. The percentage of interdependent markets increased except for Upper Egypt. The level of price interdependence is, however, still much less than compared to cereals markets in other developing countries.

Additional data sets are now available that might be useful to extend this analysis. Also it would be useful to add border prices as another variable for the post-reform period since so much of the wheat destined for urban markets comes from imports.

5. DOMESTIC WHEAT CONSUMPTION

It is quite well known that Egypt suffers from an almost chronic "wheat gap," i.e., domestic production of wheat is never sufficient to meet domestic demand at existing prices. This gap constitutes a burden on the Egyptian Balance of Trade through the persistent reliance on wheat imports which, according to the 1997 estimates, cover nearly 52% of domestic consumption. Table 5-1 shows the development of the wheat gap from 1980 through 1997. The gap can be measured in two different ways, and both are included in Table 5-1. The first is the difference between total consumption and domestic production divided by total consumption. The other measure is imports divided by total consumption. As is clear from Table 5-1, the two measures are quite similar, and the only difference between the two is changes in stocks. The gap reached its peak of 7.5 million tons in 1989.²³ The smallest gap of 5.3 million tons, on the other hand, was achieved in the year 1992.²⁴ During the post reform period, the gap has increased from 28% in 1987 to almost 48% in 1997. Egypt has one of the largest per capita consumptionlevels of wheat in the world, and it is one of the world's largest importers of wheat. In this section, we will examine in greater detail the patterns, data, and issues related to wheat, flour, and bread consumption.

This section of the wheat subsector baseline study examines six major issues. They are: 1)the amounts consumed of wheat/flour by type (82% and 72%), on the national level; 2)the development of flour prices by type, on the national level; 3)the amounts consumed and prices of bread products and pasta; 4)the amounts consumed and prices of bran; 5)the amounts consumed by the rural sector (wheat auto-consumption); and 6)the wheat-subsidy issue.

5.1 Domestic Consumption of Wheat and Flour

Two major factors are believed to seriously affect the rate of change in domestic wheat consumption. They are: the rate of population growth and the rate of growth in wheat consumption per capita. These two factors are, consequently, affected by numerous other factors such as: the adopted economic policies, income and its distribution among individuals, and the rate of change in prices and their development over time, among other factors.

A number of factors have important impacts on the quantities consumed of wheat/flour. They could be classified into three main headings: the demographic factors, the social factors, and the economic ones. The demographic factors include: population and its age, gender, and geographical distribution. Social factors include the educational and professional structures, while economic factors include both incomes and prices.

²³This large gap is despite of the national wheat campaign which has been in effect in the early eighties. The campaign has primarily relied on the extensive use of high yielding varieties (HYV) in order to increase productivity.

²⁴One reason which probably lies behind the "relatively" low estimates of the gap for the period 1991-93 is believed to be the adoption, on behalf of the GOE, of liberalization policies on both input and output fronts which encouraged farmers to grow more wheat.

Table 5-1: Domestic Consumption, Production, and Imports of Wheat, and the Consumption Gap

Year	Domestic ⁽¹⁾ Consumption (Wheat & Flour)	Domestic ⁽²⁾ Production	Wheat Gap	Gap as % of Consump- tion	Imports ⁽³⁾	Imports as % of Consumption
	(1000 Tons)	(1000 Tons)	(1000 Tons)		(1000 Tons)	
1980	7645	1796	5849	76.5%	5422	70.9%
1981	7569	1938	5631	74.4%	6076	80.3%
1982	8781	2017	6764	77.0%	6480	73.8%
1983	8825	1996	6829	77.4%	6993	79.2%
1984	9254	1815	7439	80.4%	8342	90.1%
1985	8851	1872	6979	78.8%	6921	78.2%
1986	9189	1929	7260	79.0%	6811	74.1%
1987	9570	2722	6848	71.6%	6874	71.8%
1988	9790	2839	6951	71.0%	6890	70.4%
1989	10755	3183	7572	70.4%	7527	70.0%
1990	11019	4268	6751	61.3%	7712	70.0%
1991	10315	4482	5832	56.5%	5550	53.8%
1992	9931	4618	5313	53.5%	5496	55.3%
1993	10463	4833	5630	53.8%	6118	58.5%
1994	11364	4437	6927	61.0%	6927	61.0%
1995	12105	5722	6383	52.7%	6301	52.1%
1996	12220	5735	6485	53.1%	6485	53.1%
1997	12162	5849	6313	51.9%	6246	51.4%

Source:

- (1) MTS, Central Administration of Distribution, unpublished data.
- (2) MALR, Central Administration for Agricultural Economics, Agricultural Statistics Yearbook, various issues.
- (3) MTS, Central Administration for Imports, General Administration for Interior Trade, unpublished data.

Table 5-2 contains the evolution of wheat and flour consumption (in wheat equivalent units) both in aggregate and per capita. The annual growth rate of wheat consumption over the 1980-97 period was 2.7 percent. Per capita consumption has averaged about 192 kg/person over that same

period. Since per capita consumption is essentially constant, it is clear that total consumption has been growing at about the population growth rate.

Table 5-2: Domestic Consumption of Wheat and Flour

Year	Domestic Consumption of Wheat/flour	Per Capita Consumption of Wheat/flour	Domestic Cor Flo	-	Per Capita Consumption of Flour		
	(1000 Tons)	(Kg/year)	Baladi 82%	Fino 72%	Baladi 82%	Fino 72%	
1980	7645	185	5140	1219	122	29	
1981	7569	180	5229	1371	121	32	
1982	8781	203	5442	1419	122	32	
1983	8825	198	5596	1782	122	39	
1984	9254	202	4317	2047	113	44	
1985	8851	188	5879	1968	122	41	
1986	9189	190	6015	1888	121	38	
Average	8588	192	5374	1671	120	36	
1987	9570	192	6824	2094	133	41	
1988	9790	191	7079	2238	136	43	
1989	10755	204	6517	1914	120	35	
1990	11019	203	7017	1653	126	30	
1991	10315	186	7184	1608	126	28	
1992	9931	175	7217	1751	124	30	
1993	10463	179	7139	1750	125	32	
1994	11364	191	7180	1703	128	32	
1995	12105	199	7178	1735	129	33	
1996	12220	197	7250	1729	130	35	
1997	12162	198	7320	1760	132	38	
Average	10881	192	7082	1812	128	34	

Source: MTS, Central Administration of Distribution, unpublished data.

Figures 5-1 and 5-2 display pie charts of flour consumption by type in wheat equivalent (Figure 5-1) and as flour (Figure 5-2), according to the 1997 estimates. They show that the 82% flour type (*baladi*) is dominant, followed by the rural directly milled flour, and the fino flour.²⁵

Baladi flour, i.e., 82% extraction rate, constitutes the largest fraction of flour consumed in Egypt. It is produced from both domestic and imported wheat. *Fino* flour, i.e., 72% extraction rate

²⁵Differences in the shares of each type between the two pie charts are solely due to differences in wheat units versus flour units. As could be seen from the two charts, the share of the 82% type increases at the expense of the other two types when estimated as flour.

flour, is produced in private and public cylinder mills entirely from imported wheat. Over the 1980-97 period, consumption of 82% flour grew at an annual rate of 2.1%.

It is also worth mentioning that in 1986, some conflicting pricing policies resulted in making the price of wheat flour dramatically drop to be less than that of yellow maize. The result was an increase in the consumption of 82% flour to exceed 7 million tons by the year 1988. After the implementation of the economic reform programs and the adoption of some corrective pricing policies, domestic consumption of 82% flour increased only with population increases.

Domestic consumption of fino (72% extraction rate) flour shows different patterns. In the pre-reformperiod (1980-86), fino flour consumption grew at an annual rate of 7.3 percent. In the 1987-97 time period, consumption of fino flour has actually declined at an annual rate of 1.7 percent. Figures 5-3 and 5-4 display the relationship between *fino* flour consumption and its own price in nominal and real terms, respectively. Figure 5-3 shows that the nominal prices of fino flour were fairly steady during the pre-reform period. Starting in 1989, prices jumped considerably, and the rise continued up untill the year 1995. After 1995, nominal prices grew moderately. Figure 5-3 illustrates that when prices were rising, consumption was falling. However, in the 1990s, consumption remained fairly steady despite nominal price increases. Figure 5-4 shows that, in real terms, the steadiness of nominal prices of the pre-reform period were actually real price declines. After 1987, real prices grew sharply. In the 1990s, real prices exhibited a declining trend. In sum, the consumption of fino flour appears to be quite price responsive, as illustrated in Figure 5-4.

Per capita consumption patterns are similar to the aggregate patterns. Domestic consumption of 82% flour, and consequently bread, grows at the rate of its government production, whereas that of 72% flour is price responsive, i.e., increases and decreases with decreases and increases in its own real price.

5.2 Flour Prices by Type

Figures 5-5 and 5-6 displaythe relationship between the prices of the two flour types, 82% and 72%, over the time span 1980-97 in nominal and real terms, respectively. The first shows that, in nominal terms, the prices of *baladi* flour have been almost steady during the above time period with moderate and step-like growth every 3 to 4 years, on average. The prices of *fino*, on the other hand, followed the same pattern till the beginning of the 1990s when a huge jump was experienced untill 1995, after which prices became fairly steady.

²⁶In 1986, the retail price of 82% flour was LE 0.13/kg, while that of yellow maize was LE 0.12/kg. After the elimination of the subsidy on maize in 1988, its corresponding price became LE 38/kg. In 1990, a gradual price adjustment on behalf of the GOE eventually made prices of wheat and maize LE 0.55/kg and LE 0.45/kg, respectively.

Figure 5-1

1997 Flour Consumption by Type in Wheat Units

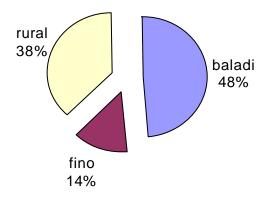


Figure 5.1: 1997 Flour Consumption by Type in Wheat Units

Figure 5.2: 1997 Flour Consumption by Type

Figure 5-2

1997 Flour Consumption by Type

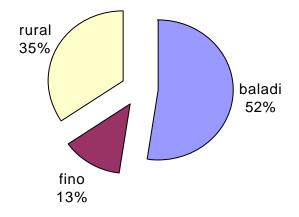


Figure 5.3: Fino Flour Consumption and Price

Figure 5-3

Fino Flour Consumption and Price

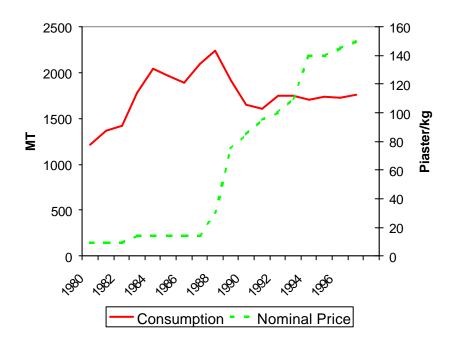


Figure 5-4

Fig **Fino Flour Consumption and Price** ure **5.4** : 2500 60 Fin 0 50 2000 Flo 40 ur 1500 Co F 30 nsu 1000 mp 20 tio n 500 10 and Pri ce Consumption - - Real Price

In real terms, the picture is somewhat different. As Figure 5-6 shows, the prices of *baladi* flour directed to bakeries have been experiencing ups and downs with an overall downward trend, particularly at the beginning of the 1990s. Real prices of *fino* flour, on the other hand, have followed the same pattern untill the beginning of the 1990s, when a huge jump occurred. Following 1991, prices were steadily growing at very moderate rates, with a trend downward as of 1996. The reason for the above time patterns for these prices is that price liberalization policies adopted by the GOE in the late eighties have not touched the prices of *baladi* flour, but the prices of *fino* flour were left to free-market forces with no subsidies whatsoever.²⁷ In 1998, although we do not yet have firm data, it appears that the price of fino flour fell considerably due to the over capacity in fino milling.

The examination of Table 5-3 further shows that flour prices directed to warehouses, though different in value from those directed to bakeries, follow an almost identical time pattern. ²⁸ The price of baladi bread in recent years has been constant in nominal terms and declining in real terms.

The retail prices of 82% flour have increased from LE 0.07/kg in 1980 to LE 0.13/kg in 1986 (a 10.3 percent nominal rate), with an average of LE 0.10/kg, for the period 1980-86. For the post-reform period 1987-97, prices have increased from LE 0.13/kg in 1987 to LE 0.55/kg, for the period 1988 and after. The corresponding average price increase is estimated at LE 0.512/kg for the period 1987-97. The annual nominal growth rate of 82% flour retail prices is estimated at 14.4% for the post-reform period.

Retail prices of 72% flour have increased from LE 0.09/kg in 1980 to LE 0.14/kg in 1986, with an average of LE 0.118/kg, for the pre-reform period. After the implementation of the reform programs, prices have increased from LE 0.14/kg in 1987 to LE 1.50/kg in 1997, with an average of LE 0.985/kg. The corresponding annual increase in nominal prices for the pre-reform period is 7.4%; whereas, for the post-reform period, prices have grown annually by a rate of 23.7% (or LE 0.1327/kg).

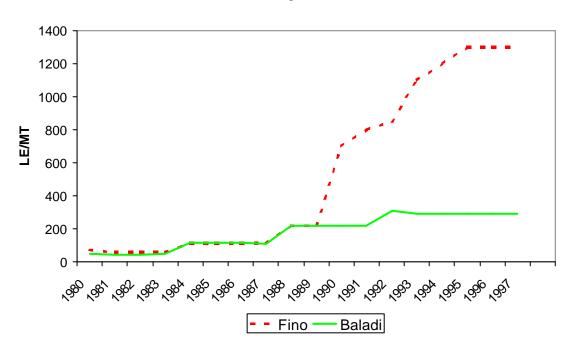
²⁷In fact, the prices of *baladi* flour seem to be "untouchable" given the continuous iterations by the President and the Prime Minster themselves, the latest of which came out in late November 1998. Consequently, it is anticipated that the real prices of *baladi* flour directed to bakeries will continue to decline, whereas those of *fino* are subjected to market forces.

²⁸*Baladi* flour prices directed to warehouses are found to be always significantly higher than those directed to bakeries for the period 1980-97. In the case of *fino* prices, those directed to warehouses are found to be higher than those directed to bakeries till the year 1989. Starting the year 1990, *fino* flour prices directed to warehouses or bakeries became identical.

Figure 5.5: Nominal Bakery Flour Prices

Figure 5-5

Nominal Bakery Flour Prices



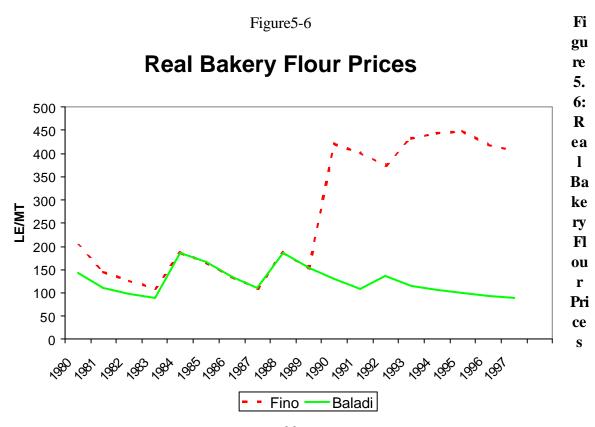


Table 5-3: Historical Prices of Different Types of Flour and Bread Bran, and Pasta

				Flour D	irected					
	Flou	ır Directe	ed to	to Ware			Flour Re	etail Prices	Baladi &	Pasta
Year	Bake	eries (LE/	/Ton)	(LE/	Ton)	Bran	(pias	ter/kg.)	Shami	(72%)
	82%	76%	72%	82%	72%	(LE/Ton	82%	72%	(piaster)	(piaster/kg.
1980	50	70	71	60	82	25	7	9	1	12
1981	43	58	56	60	82	25	7	9	1	13
1982	43	58	56	60	82	25	7	9	1	13
1983	46	58	56	118	125	60	10	14	2	13
1984	112	112	112	118	125	60	13	14	2	13
1985	112	112	112	118	125	60	13	14	2	15
1986	112	112	112	118	125	60	13	14	2	20
Average	74	82.9	82.1	93.1	106.6	45	10	11.9	1.6	14.1
1987	110	110	110	118	125	60	13	14	2	30
1988	220	220	220	250	250	250	55	30	5	50
1989	218	218	218	250	250	250	55	75	5	100
1990	218	320	700	500	700	400	55	85	5	100
1991	218	310	800	500	800	350	55	95	5	100
1992	310	310	850	500	850	325	55	100	5	120
1993	290	300	1100*	500	1100	225	55	??	5	150*
1994	290	300	1200	500	1200	325	55	140	5	175
1995	290	300	1300	500	1300	400	55	140	5	200
1996	290	300	1300	500	1300	450	55	145	5	250
1997	290	300	1300	500	1300	500	55	150	5	250
Average	249 5	271.6	827 1	410.8	834 1	321.4	51.2	99	4.7	138 6

Source: MTS, Central Administration of Distribution, unpublished data.

* Starting from the year 1993 up to 1997, the prices for flour directed bakeries (LE/Ton) (72%), flour retail prices (piaster/kg)

(72%), and pasta (72%) are from CAPMAS, Quarterly Report, Bulletin for Food Prices, different issues.

5.3 Consumption and Prices of Bread Products and Pasta

5.3.1 Baladi Bread

Domestic consumption of *baladi* bread has increased from 5687.4 thousand tons in 1980 to 8696.1 thousand tons in 1986, for the pre-reform period 1980-86 (Table 5-4). For the post-reform period 1987-97, the corresponding figures have changed to 9973.5 thousand tons in 1987 and 14663.1 thousand tons in 1997. The annual increase in domestic *baladi* bread consumption is estimated at 543.67 thousand tons (7.1% annual growth rate), for the period 1980-86. For the post-reform period, the annual increase is 3.9%.

Domestic consumption of *baladi* bread per capita, on the other hand, varied between a minimum of 135 kg/year in 1980 and a maximum of 182 kg/year in 1985, for the pre-reform period 1980-86. These figures have changed to 194 kg/year in 1987 and 215 kg/year in 1994, for the post-reform period 1986-97. The annual increase in individual *baladi* bread consumption is estimated at 7.5 kg (4.2%) and 2.27 kg (0.9%) for the pre and post-reform periods, respectively. The slower increase in the post-reform period is probably due to government decisions to limit growth in supply rather than low growth in consumer demand.

5.3.2 Pasta

Table 5-3 shows that pasta prices have increased from LE 0.12/kg in 1980 to LE 0.20/kg in 1986, with an average of 0.141/kg, during the pre-reform period. After the implementation of the reform programs, the price has increased from LE 0.30/kg in 1987 to LE 2.50/kg in 1997, with an average of 1.39/kg. Moreover, the annual increase in pasta prices is found to be 8.5% for the pre-reform period. On the contrary, a significant annual growth rate of 21.2% is reached for the post-reform period.

5.4 Bran Consumption and Prices

Domestic consumption of bran (Table 5-4) varied between a minimum of 2119.7 thousand tons in 1980 and a maximum of 2529.9 thousand tons in 1985, during the period 1980-86. For the period 1987-97, the corresponding figures became 2204.9 and 2976.3 thousand tons between 1987 and 1997. The annual increase in domestic bran consumption is estimated at 66.66 thousand tons (2.6% annual growth rate) for the period 1980-86. For 1987-97, the annual increase was 2.1%.

Data in Table 5-2 reveal that bran prices increased from LE 25/ton in 1980 to LE 60/ton in 1986, for the pre-reform period. After the implementation of the reform policies, bran prices have increased from LE 60/ton in 1987 to LE 500/ton in 1997. The annual nominal increase in bran prices is estimated at 14.6% for the pre-reform period and 21.2% for the post-reform period.

Table 5-4: Historic Baladi Bread and Bran Consumption

Year	Baladi Bread Consumption (1000 Tons) ⁽¹⁾	Baladi Bread Per Capita Consumption (kg./year) ⁽²⁾	Bran Consumption (1000 Tons) ⁽¹⁾	
1980	5687.4	135	2119.7	
1981	6163.3	142	2208.2	
1982	6968.9	156	2298.5	
1983	7392.5	161	2464.6	
1984	7953.2	169	2441.6	
1985	8769.6	182	2529.9	
1986	8696.1	174	2479.7	
Average	7375.9	159.9	2363.2	
1987	9973.5	194	2204.9	
1988	10241.0	194	2760.2	
1989	10512.6	194	2791.1	
1990	11152.7	201	2976.3	
1991	11155.8	196	2973.2	
1992	11422.2	196	2906.5	
1993	12782.3	213	2661.0	
1994	12973.4	215	2688.8	
1995	13392.6	208	2752.1	
1996	13752.1	212	2700.6	
1997	14663.1	212	2713.8	
Average	12001.9	203.2	2739.0	

Source:

- (1) MTS, Central Administration of Distribution, unpublished data.
- (2) Calculated by dividing baladi bread consumption by the total population, which from CAPMAS.

5.5 Wheat Auto-Consumption

The apparent discrepancy between wheat production estimates and likely levels of home consumption by rural farmers has been called by Dr. Abla Abdel-Latif the "Egyptian Wheat Paradox." In her paper, she argues that the most likely resolution is that the wheat production estimates are above the actual production levels. Further, she argues that the milling capacity does not exist in rural areas to handle the implied quantity consumed from the production statistics. This issue is very important and cannot be resolved without further analysis, survey work, and additional checks on the statistical estimation system. ³⁰

The following section presents an attempt to estimate the auto-consumption component of the rural sector in Egypt. That is to say, the amounts of wheat consumed by farmers for their own human

²⁹Abdel-Latif, 1998.

 $^{^{30}}$ Dr. Morsey Aly Fawzy"s paper on the statistical estimation systems used in Egypt also calls into question the validity of the government production estimates.

needs, net of animal needs and/or seeds considerations. It should be noted, however, that in this section we make some assumptions, which are believed to be as close to reality as possible to undergo this estimation process, since no data are found to be available in this regard.

Any of several procedures could be used to attempt to estimate the actual levels of home consumption in rural areas. The approach we have used is contained in Table 5-5. It starts by subtracting urban consumption from total national consumption to obtain an estimate of total rural consumption. Then animal consumption and seeds usage is subtracted from total rural consumption to get rural human consumption. Rural population percentages are then used to estimate the fraction of imports consumed in rural areas, and that value is subtracted from rural human consumption to get rural human consumption from domestic production. That value is then taken as a fraction of estimated production to obtain the estimated fraction of domestic production consumed by people in rural areas (the last column in Table 5-5).

While the fractions in Table 5-5 are reasonable (around two-thirds of domestic production), a key question is whether or not sufficient rural milling capacity exists to handle the estimated 3-4 million metric tons shown in Table 5-5. That question is difficult to answer because the data on rural milling capacity is not complete.

Table 5-5 shows that farmers' human auto-consumption varied between a minimum of 1.46 milliontons in 1987 and a maximum of 3.96 million tons in 1995, with an average of 3.03 million tons for the period 1987-97. Moreover, the percentage of farmers' auto-consumption of wheat to wheat domestic production varied between a minimum of 59.7% in 1987 and a maximum of 77.8% in 1993, with an average of 68.8% over the above period.³¹

5.6 The Wheat Subsidy Issue

The discussion of wheat-domestic consumption would not be rendered complete without touching upon the issue of wheat subsidy. The subsidization of wheat is believed to seriously affect the amounts consumed of wheat/flour. This section, accordingly, presents a briefing on the wheat/flour subsidy issue.

A subsidy is defined as a negative tax, i.e., something that the GOE pays rather than receives. It is connected to two major things: pricing policy and national income distribution policy. It represents the difference in prices between the cost of producing the final product (bread or flour) and its corresponding retail price.

³¹IFPRI conducted a recent producers' survey in 1998, the results of which are projected to be available in March 1999. In their survey, calculations are made for the percentages of farmers' human auto-consumption, animal feed, and seeds, relative to wheat domestic production, on the national level and by governorate. The results showed that, on the national level, the ratios of farmers' auto-consumption to total domestic wheat production are estimated at 54.7% and 53.4% for 1997 and 1998, respectively. On the governorate level, Qalubia came on top with ratios of 91.4% and 91.3% for 1997 and 1998, respectively. Alexandria and Fayoum achieved the lowest ratios of 29.7% and 23.9% in 1997 and 1998, respectively. Ratios of animal feed and seed to domestic production are found to be both negligible.

Table 5-5: Estimation of Potential Rural Human Consumption from Domestic Production

	Domestic ⁽¹⁾				Amount ⁽²⁾		The Share (1) of the Rural Sector		Domestic ⁽²⁾	% Auto.
	Consumption	Urban ⁽¹⁾	Total Rural ⁽¹⁾	Animal ⁽²⁾	Seeds	Rural Actual	of Total	Farmers	Prod.	Cons./
Year	(Wheat only)	Consumption	Consumption	Consumption	Retained	Consumption	Imports	Consumption	(1000 Tons)	Prod.
1987	7869	3656.5	4212.5	881	103	3228.5	1769.5	1459.0	2721	53.6%
1988	9851	4269.5	5581.5	956	107	4518.5	2742.5	1776.0	2839	62.6%
1989	9961	4555.0	5406.0	970	115	4321.0	2223.0	2098.0	3183	65.9%
1990	10622	4555.4	6066.6	1086	147	4833.6	1780.6	3053.0	4286	71.2%
1991	10611	4448.1	6162.9	1051	166	4945.9	1680.9	3265.0	4482	72.8%
1992	10373	4071.7	6301.3	921	157	5223.3	1684.3	3539.0	4617	76.7%
1993	9497	4119.9	5377.1	896	163	4318.1	597.1	3721.0	4780	77.8%
1994	9596	4181.4	5414.6	978	158	4278.6	1314.6	2964.0	4100	72.3%
1995	9822	4309.6	5512.4	1365	188	3959.4	0.0	3959.4	5700	69.5%
1996	9638	4370.8	5267.2	1260	182	3825.2	0.0	3825.2	5735	66.7%
1997	9685	4432.0			186		0.0			
Average	9775	4270 0	5505.0	1070 4	152	4282.6	1253.9	3028 8	4390 27273	69.0%

Source: (1) MTS, Central Administration of Distribution, unpublished data.

Data on domestic production are from the Agricultural Statistics Yearbook, issues from 1987-1997.

Data on animal consumption and the amount of seed required are unpublished data.

⁽²⁾ MALR, Central Administration for Agricultural Economics:

5.6.1 An Overview³²

The Government of Egypt has adopted food and non-food subsidy policies for more than 50 years. The main reason for adopting these policies lies in the persistent increases in population and low per-capita incomes. The ultimate objective of adopting a wheat/flour subsidy policy is to assure general access by the population to a basic food product, bread.

The high and increasing cost of food subsidies has become a major concern to Egyptian policy makers. Since the mid-1980s, the GOE has used a variety of strategies to reduce food subsidies on a slow and gradual basis. They have included: increasing the price of subsidized food commodities, reducing the number of ration cardholders, and reducing both the number and quantity of subsidized food items available to consumers.

For instance, coverage of the population under the ration system has been reduced from 91.6% in 1987 to 69.2% in 1997 through various measures. In 1992, the GOE eliminated the subsidy on *fino* flour/bread. By May 1993, only five items remained subsidized: *baladi* bread, *shami* bread, *baladi* wheat flour, sugar, and edible oil. The price of *baladi* bread has been gradually increased from LE 0.005/loaf in 1980, to LE 0.01/loaf in 1980, to LE 0.02/loaf in 1984, to LE 0.05/loaf in 1989 and up to the present time. Moreover, the subsidy reduction phase embodied some indirect actions such as the gradual reduction of the weight of the loaf of subsidized *baladi* bread (from 168 grams to 160 grams in 1984, and to 130 grams in 1991 and to present).

Other subsidy-reduction measures include the experimentation with a new subsidized *baladi* bread which is made with 20% maize flour mixed with 80% wheat flour on a limited basis (in metropolitan Cairo only). This began in December 1995. By march 1998, the experimentation was extended to all Cairo and Alexandria.

As a consequence, the explicit cost of food subsidies has fallen from 13.9% of total Government expenditures in 1980/81 to 5.5% of such expenditures in 1996/97 (Table 5-7). Table 5-7 shows that, in 1996/97, the total cost of Egypt's food subsidy system was estimated at LE 3.74 billion, out of which *baladi* bread accounted for 61.7%, and wheat flour 14.9%. Table 5-6 displays the rates of subsidy to consumers per unit of commodity in 1996/97. It shows that the corresponding rates of subsidy for *baladi* bread and wheat flour are estimated at 56.9% and 43.1%, respectively.

Table 5-8 displays the regional differences in the 1997 allocations of food-subsidy benefits in per-capita terms, disaggregated by urban and rural Governorates.³⁴ Table 5-8 shows that there is an

³²This section draws heavily from Ahmed et al. 1998. Their analysis is based on interviewing urban and rural households in March-May 1997, which is called the Egypt Integrated Household Survey (EIHS).

³³The subsidy on shami bread and flour was removed in 1996.

³⁴The authors have calculated the benefit to consumers per unit of subsidized food as the difference between the subsidized price of food and what consumers would have to pay for this food in the absence of subsidies. This subsidy benefit per unit of commodity is then multiplied by the per-capita supply of that

urban bias in the allocation of food subsidies in Egypt. Despite the fact that 57% of Egyptian population live in rural areas, only 30% of total food subsidy was allocated to them. A major part of the difference in the allocation of benefits to urban and rural areas is due to the much higher quantities of subsidized *baladi* bread made available to urban dwellers. Moreover Table 5-9 displays the distribution of the total quantity of subsidized wheat flour by Governorates. The amounts of flour going to bakeries in the urban areas outweigh those going to the rural areas for all regions: Metropolitan, Lower, Upper, and Frontier Governorates. In the case of the amounts of flour going to warehouses, only the Metropolitan and urban Frontier Governorates enjoy larger amounts of flour as compared to rural areas of the rest of Governorates.

5.6.2 Subsidized Bread

Subsidized bread is available for consumption to all Egyptian inhabitants at a current fixed uniform price of LE 0.05/loaf. Table 5-10 shows that in 1997, the Ministry of Trade and Supply (MTS) supplied a total of almost 4.67 million tons of subsidized 82% wheat flour, out of which 73.2% was distributed to bakeries to produce this type of bread. The remainder was distributed to warehouses. Of the total number of 10,693 bakeries in Egypt making *baladi* bread, 96% are in the private sector, 71% of which are located in urban areas. According to the 1997 estimates, these urban bakeries received 82% of the total quantity of subsidized wheat flour allocated to all bakeries. Rural bakeries received the rest.

Bakers are required to produce 10 loaves of *baladi* bread per kg of flour, each loaf must weigh 130 grams. Officials from MTS monitor this production process to guard against leakage.

5.6.3 Subsidized Wheat Flour

Except for the four metropolitan Governorates of Cairo, Alexandria, PortSaid, and Suez, 82% flour generally is available to all consumers without restrictions. In 1997, a total of 1.25 million tons of flour was distributed to privately-operated warehouses. Consumers purchase subsidized flour directly from them. The current number of these warehouses is 20,996 throughout Egypt, out of which 72% are located in rural areas. According to the 1997 estimates, rural warehouses received 73% of the total quantity of subsidized flour allocated to all warehouses in Egypt. This flour is sold at prices of LE 529/ton to warehouses.³⁵ The price to consumers is fixed at LE 0.55/kg, or equivalently LE 550/ton.

Table 5-11 indicates that 92.6% of households living in metropolitan Governorates purchased subsidized *baladi* bread. On the national level, however, only 16.9% of all Egyptian households purchased subsidized wheat flour. Furthermore, one-third of households in rural areas purchased

commodity to each Governorate in order to calculate the per-capita subsidy benefit for the commodity in that Governorate.

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³⁵The price to bakeries is LE290/ton with the difference between the warehouse and bakery prices paid to millers by GASC.

subsidized wheat flour, as opposed to only 13.3% of households in urban areas, excluding metropolitan Governorates.³⁶

In summary, the following major points could be extracted from the IFPRI integrated household survey and subsidy analysis:

- Wheat flour accounts for almost 75% of total food subsidy cost and consequently of the subsidy benefit to consumers;
- About 80% of wheat for the subsidy system is imported;
- There is an urban bias in the allocation of food subsidies thanks to the large quantities of *baladi* bread made available to urban consumers;
- Geographic allocation of food subsidies is not very sensitive to the geographic distribution of total poverty which is concentrated in rural Egypt.

Table 5-6: Rates of Consumer Food Subsidy by Commodity, 1996/97

Subsidized Foods	Full Cost	Subsidized Price	Rate of Subsidy
	(LE)	(LE)	(percent)
Baladi bread (per loaf)	0.12	0.05	56.9%
Wheat flour (per kilogram)	0.97	0.55	43.1%
Sugar (per kilogram):			
Green card (fully subsidized)	1.32	0.50	62.1%
Red card (partially subsidized)	1.32	0.75	43.2%
Edible oil (per kilogram):			
Green card (fully subsidized)	2.18	1.00	54.1%
Red card (partially subsidized)	2 18	1 25	42 7%

Source: Ahmed et al. 1998, p. 72.

 $^{^{36}}$ For more information on the wheat-subsidy issue, refer to the IFPRI studies on this topic.

Table 5-7: Total Subsidy Costs by Commodity of Egypt's Food Subsidy System

Year	Bread	Wheat Flour	Sugar	Cooking Oil	Other Commodities	Total Food Subsidies	Total Food Subsidies	Total Government Expenditure	Food Subsidies as Percentage of Total Government Expenditure
			(LE million)	(nominal te	rms)		(LE million) (real terms)	(LE million) (nominal terms)	(percent)
1980/81	618.7	147.4	141.2	76.7	443.3	1427.3	5266.8	10250	13.9%
1981/82	633.1	155.0	95.7	76.1	662.0	1621.9	5984.9	12260	13.2%
1982/83	596.0	142.9	62.2	46.4	563.6	1411.1	4451.4	14645	9.6%
1983/84	544.4	97.6	46.1	133.1	878.8	1700.0	4657.5	16232	10.5%
1984/85	526.8	100.3	59.5	166.6	774.5	1627.7	4238.8	18277	8.9%
1985/86	557.8	104.6	117.3	129.0	659.9	1568.6	3902.0	24285	6.5%
1986/87	538.1	97.3	176.3	52.5	462.3	1326.5	2902.6	24530	5.4%
1987/88	578.5	99.8	255.8	37.4	142.8	1114.3	2142.9	33460	3.3%
1988/89	460.7	164.1	378.0	48.5	264.8	1316.1	2136.6	33400	3.9%
1989/90	698.0	250.4	516.0	47.7	315.4	1827.5	2503.3	34230	5.3%
1990/91	612.5	377.4	509.3	160.0	333.9	1993.1	2386.9	42168	4.7%
1991/92	928.7	495.8	583.5	367.9	106.7	2482.6	2482.6	47563	5.2%
1992/93	1026.1	546.9	507.3	276.9		2357.2	2144.8	52223	4.5%
1993/94	1322.6	241.0	149.5	243.3		1956.4	1663.6	56264	3.5%
1994/95	1328.7	174.8	209.3	349.2		2062.0	1602.1	58526	3.5%
1995/96	1945.6	305.8	310.6	402.5		2964.5	2111.4	63889	4.6%
1996/97	2307 8	558.6	489.5	384 7		3740.6	2517.2	67451	5.5%

Source: Ahmed et al. 1998, page 71.

Table 5-8: Allocation of Per Capita Food Subsidy Benefits by Governorate, 1997

	Total Food Subsidy Benefits							
Governorate	Urban	Rural	All					
	(LE/pers	son/year)						
Cairo	94.62	0.00	94.62					
Alexandria	74.36	0.00	74.36					
Port Said	67.56	0.00	67.56					
Suez	65.43	0.00	65.43					
Metropolitan	86.23	0.00	86.23					
Damietta	139.24	54.33	77.64					
Dakahlia	80.34	17.17	34.75					
Sharkia	115.00	11.86	35.15					
Kalyoubia	79.88	39.14	55.74					
Kafr El-Sheikh	69.83	20.37	31.71					
Gharbia	95.19	21.30	44.24					
Menoufia	165.93	34.31	60.50					
Behera	88.00	20.08	35.62					
smailia	104.03	36.80	68.84					
Lower Egypt	97.23	23.55	43.84					
Giza	68.40	58.85	64.02					
Beni-Suef	114.72	13.27	37.15					
Fayoum	134.60	32.94	55.78					
Menia	134.71	27.40	48.25					
Assyout	116.97	30.16	53.81					
Suhag	105.22	37.37	52.23					
Quena	138.59	50.53	69.19					
uxor	70.47	0.00	70.47					
Aswan	110.68	70.93	87.94					
Upper Egypt	98.93	37.95	57.29					
Frontier Governorates	97.52	38.49	74.48					
Fgypt Total	92.94	29.99	57.04					

Source: Ahmed et al. 1998, p.74.

 $Table \ 5-9: \ Distribution \ of \ Subsidized \ Flour \ by \ Governorate, \ 1997$

	Flo	ur to Bakeri	es	Flo	ur to Wareho	uses	
Governorate	Urban	Rural	Total	Urban	Rural	Total	
			(1000 m	netric tons)			
Cairo	819.4		819.4	0.0		0.0	
Alexandria	298.2		298.2	12.9		12.9	
Port Said	39.0		39.0	0.9		0.9	
Suez	33.7		33.7	2.0		2.0	
Metropolitan	1190.3		1190.3	15.8		15.8	
Damietta	44.5	17.3	61.8	3.8	40.2	44.0	
Dakahlia	155.5	30.9	146.4	2.0	6.8	8.8	
Sharkia	149.2	32.6	181.1	0.0	0.2	0.2	
Kalyoubia	142.9	83.7	226.6	0.6	9.3	9.9	
Kafr El-Sheikh	34.2	5.8	40.0	3.8	39.1	43.0	
Gharbia	122.5	20.3	142.8	18.2	28.0	46.2	
Menoufia	88.6	36.0	124.6	20.9	69.2	90.1	
Behera	92.6	31.8	124.4	20.5	50.2	70.7	
Ismailia	48.3	5.9	54.2		12.7	12.7	
Lower Egypt	838.2	264.3	1102.6	69.8	255.8	325.6	
Giza	226.1	129.5	355.6	0.0	85.0	85.0	
Beni-Suef	70.8	22.5	93.3	5.0	9.5	14.5	
Fayoum	52.8	26.5	79.3	27.8	63.9	91.7	
Menia	118.5	83.0	201.5	1.0	0.1	1.1	
Assyout	88.2	32.2	120.4	45.9	68.0	113.9	
Suhag	68.8	25.3	94.1	53.0	169.0	222.0	
Quena	52.6	16.9	69.5	58.3	168.5	226.8	
Luxor	14.9	0.0	14.9	34.1	0.0	34.1	
Aswan	40.0	7.5	47.5	28.6	64.5	93.1	
Upper Egypt	732.7	343.4	1076.1	253.7	628.5	882.2	
Red Sea	15.2	0.5	15.7	4.5	1.5	6.0	
Matrouh	14.6	1.9	16.5	4.0	0.4	4.4	
El Wadi El Guedid	2.9	2.3	5.2	0.85	2.4	3.2	
North Sinai	10.4	1.2	11.6	7.8	7.9	15.0	
South Sinai	6.4	0.1	6.5	2.1	0.9	3.0	
Frontier	49.5	6.0	55.5	18.6	13.0	31.6	
Egypt Total	2810.8	613.7	3424.5	358.0	897.2	1255.2	

Source: Ahmed et al. 1998, p. 110.

Table 5-10: Distribution by Governorate of Bakeries for Baladi Bread, 1997

	Num	ber of bak	eries	Number of Bakeries per 100,000 population			
Governorate	Urban	Rural	Total	Urban	Rural	Total	
Cairo	1480		1480	22		22	
Alexandria	860		860	26		26	
Port Said	130		130	28		28	
Suez	97		97	23		23	
Metropolitan	2567		2567	23		23	
 Damietta	138	72	210	55	11	23	
Dakahlia	457	183	640	39	6	15	
Sharkia	395	258	653	41	8	15	
Kalyoubia	417	299	716	31	15	22	
Kafr El-Sheikh	202	77	279	40	4	13	
Gharbia	380	111	491	36	5	14	
Menoufia	245	184	429	45	8	16	
Behera	281	320	601	31	10	15	
Ismailia	189	40	229	55	11	32	
Lower Egypt	2704	1544	4248	38	8	16	
Giza	496	258	754	19	12	16	
Beni-Suef	140	113	253	32	8	14	
Fayoum	190	86	276	43	6	14	
Menia	420	420	840	65	16	25	
Assyout	230	210	440	30	10	16	
Suhag	292	162	454	43	7	15	
Quena	171	119	290	33	6	12	
Luxor	25	0	25	7	0	7	
Aswan	85	63	148	20	11	15	
Upper Egypt	2049	1431	3480	30	10	16	
Red Sea	50	22	72	36	128	46	
Matrouh	55	28	83	49	28	39	
El Wadi El Guedid	21	11	32	31	15	23	
North Sinai	130	55	185	87	53	73	
South Sinai	20	6	26	68	24	48	
Frontier	276	122	398	55	38	49	
Egypt Total	7596	3097	10693	30	9	18	

Source: Ahmed et al. 1998, p. 112.

Table 5-11: Share of Households Purchasing Baladi Bread and Flour by Region and Expenditure Quintile, 1997

	P	Per Capita Expenditure Quintile					
	Lowest				Highest		
	(1)	(2)	(3)	(4)	(5)	Average	
		(percei	nt of all su	ırvey hoı	ıseholds)		
Baladi bread							
Egypt	79.5	75.2	72.4	78.7	73.3	75.8	
Metropolitan	97.2	94.5	88.9	94.5	87.5	92.5	
Other Urban	87.4	83.9	79.2	89.5	77.6	83.5	
Rural	58.3	52.2	53.3	56.1	58.4	55.7	
Wheat flour							
Egypt	17.1	22.0	16.3	14.2	15.1	16.9	
Metropolitan	0.0	0.0	0.0	0.0	0.0	0.0	
Other Urban	14.7	18.2	14.6	7.7	11.2	13.3	
Rural	32.3	42 4	30.2	31 4	30.2	33.3	

Source: Ahmed et al. 1998, p. 78.

6. STRUCTURE, CONDUCT, AND PERFORMANCE

This section summarizes the information in Chapters 2-5 utilizing the Structure-Conduct-Performance (SCP) paradigm. The purpose in this chapter is not to conduct formal performance analysis of each sector in the wheat-flour-bread chain but to use SCP to characterize the organization and actions of these wheat sectors with the information provided in this study. Also, the section does not repeat the more detailed data in the previous sections. For clarity, divisions of this chapter will follow the topics of production (Chapter 2), importing (Chapter 3), processing and distribution (Chapter 4) and consumption (Chapter 5). Within each of these sector divisions and where information is available, the SCP discussion will contain subsections as outlined below:

Structure: organization of the institutions, economies of scale, entry barriers, and economies of scope;

Conduct: degree of integration, horizontal differentiation, vertical differentiation, and asset utilization incentives;

Performance: measures of efficiency and profitability (where applicable).

6.1 Domestic Wheat Production

6.1.1 Structure of Production Sector

In recent years, the government procurement price of wheat has increased significantly, and farmers have responded with increased production. Egyptian wheat farmers sell their production to PBDAC, traders, cooperatives, or mills. All of the wheat that is marketed is, in turn, delivered to the baladi mills. According to the information taken from IFPRI's *Producer Survey*, approximately two-thirds of Egyptian wheat production reaches the market. Farmers retain the other wheat for household consumption. Producers take the retained wheat to village mills for milling service but never lose ownership of this wheat in the process.

6.1.2 Conduct of Production Sector

In the past, PBDAC was established as the mechanism for collecting the wheat quotas while offering credit to farmers. Since deregulation, PBDAC has continued to purchase wheat and has recently begun offering cash on delivery to farmers to compete with private traders. The extensive role of private traders may be growing. Traders often finance input credit and facilitate transportation of wheat to mills. These traders have the opportunity to capture additional margins if they expand their facilities to move and store wheat.

Producer behavior varies by region. In the Urban and Frontier governorates, producers' actions reveal a price-taking farming structure in which individual farmer-businesses produce primarily for market. In these locations, traders purchase wheat directly on the farm. Especially in the Frontier governorates, these traders provide input credits and are trusted links for the farmer.

In the other regions of Egypt, farmers themselves utilize more storage and transport options. This is motivated by their own consumption of large portions of their wheat production. Combined, these facts suggest that wheat producers do have a degree of choice in determining quantity supplied. Producers are not indifferent to price changes, as seen in the vast increase in land farmed for wheat since the rise in wheat prices since deregulation.

6.1.3 Performance of Production Sector

Although there are many possible gauges for performance of the production sector, this report only considers two broad indicators — an irrigated wheat yield statistic and a price transmission consideration. The FAO maintains a listing of government reported yields in which Egyptian farms yielded 58,030 KG/HA of wheat in 1998. Compared with Saudi Arabia, Egyptian producers sustained higher yields in irrigated wheat during the 1980-1998 period while both countries have experienced quite large increases in productivity (but increasing at a decreasing rate).

Table 6.1: Irrigated Wheat Yield for Egypt and Saudi Arabia

(Hg/ha)

Countries	1980	1990	1998
Egypt	31,175	51,967	58,030
Saudi Arabia	21,083	46,461	53,571

Source: FAO Statistics Database, 1998.

Finally, an area of inefficiency can be inferred from IFPRI's price transmission analysis. The price of wheat in individual governorates is not as closely correlated with the price in other governorates as would be expected. Local governments may be blocking the free movement of wheat to restrict the outflows of wheat to other governorates. Reasons exist for governorates to ensure that wheat produced in individual governorates remains in that area for further value adding at the mills. The price transmission and correlation analyses confirmthe fact that the governorates are effective in inhibiting the free flow of wheat to other locations offering potentially higher prices.

6.2 Imports

Handling 75%-90% of total shipments, GASC is the primary importer of wheat for Egypt. In recent years, importation of flour has almost disappeared and shipments of wheat have risen to well over 6 million MT/year of wheat. The infrastructure and capabilities of GASC are assumed to be adequate and efficient. Until mid-1996, it appeared that GASC was clearly effective in securing purchase prices below the world market prices (refer to Figure 3.2). In the last two years, however, unit purchase prices for wheat have exceeded the simulated CIF prices, which may indicate a lessened degree of efficacy in GASC importing practices.

6.3 Processing and Distribution

6.3.1 Structure of Fino Mills

The 1999 production capacity of fino flour mills is almost equally divided between the public and private sectors. Since 1993, many of the mills that were previously run under private contract have returned to direct government control. Whereas the 19 public sector mills average 320 tons/day in production capacity, the average capacity of the 23 private fino mills in or coming into operation is 290 tons/day. Closer observation of the private mills' capacity reveals two levels of mill size; ten of the mills average 500 tons/day, and the remaining thirteen mills average 130 tons/day. This suggests a lumpiness in the fixed costs of milling technology despite the fact that most fino mills use comparable new cylinder technology.

There are no regulatory barriers to entering the fino milling sector, and the fino flour market is almost free of government intervention. However, the initial investment for new technology mills is estimated to be \$40,000 per ton of daily capacity,³⁷ and new mills must compete against public mills whose fixed assets may be government transfers and not subject to depreciation expense to the mill. Additionally, millers are restricted to producing either fino or baladi flour but not both. Benefits from economies of scope could not be realized.

6.3.2 Conduct of Fino Mills

GASC provides all of the imported flour to the public fino mills, capturing scale effects from importing. Transportation logistics are usually handled by public agencies. Thus, while public mills have less control of their supply flows, they may have less costs associated with these activities. Private mills are nearly perfectly integrated with their input supply. Mills operate as importers, handle their own transportation and utilize an average of 30 to 40 days of on-site storage to ensure efficient streams of supply. To capture boat importation scale effects, some mills have reasons to handle supply horizontally with other private mills. Supply competition does not exist because importing of wheat is prohibited for all private entities except for owners or renters of mills.

The projected fino milling capacity for 1999 is approximately double the total demand for fino flour. With over-capacity in the market, competition among the mills to secure sales contracts with buyers is strong and will likely become fierce with new mills coming online. Market share objectives will become more important than tacit collusion in maintaining profitable price offerings. The fino flour is a regulated standard of 72% wheat extract, and therefore product differentiation is not a marketing option for the millers. The use of contracting and transportation conveniences may be the only tools the mills have to vertically differentiate their fino flour. With profit incentives and coordination already in place for supply integration, private millers may find further motivation for alignments or consolidation in efforts to capture scale effects in marketing and transportation. This may be especially pertinent in light of the fact that some large private mills have been built in remotely located areas to take advantage of tax incentives in the new industrial cities.

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³⁷ Krenz, 1998, p.17.

As the market price of fino flour drops with excess supply, we should expect that mills with either the lowest marginal costs or the strongest buyer contracting will survive. However, in that the public mills may have cost advantages in terms of assets whose depreciation is not expensed to the mills, arranged wheat supply, tax and utility payment savings, and debt capacity, the newer and perhaps more efficient private mills may not be as competitive as one might think.

6.3.3 Performance of Fino Mills

If the fino flour market is competitive, prices would be expected to equalize across markets after accounting for transportation differences from the production facilities. Badiane and Kherallah and later Mendoza and Gruhn find that although there is a growing interdependency in the fino flour market, the price transmission of fino flour between the urban and rural areas is poorly connected. This inefficient pricing mechanism would suggest that there is potential for spatial arbitrage in storing and transporting fino flour.

A full performance analysis of fino mills by size and by ownership would be very informative. Data for such a study was not readily available for this report. IFPRI results showed that there are efficiencies in scale, capacity utilization, location and ownership. Price-cost margins have been large in fino flour mills relative to baladi mills. If we assume that baladi mills work near the breakeven point, this would suggest that there has been either effective market power pricing, perhaps due to previously large entry barriers to milling, or efficiency in the technology and size of fino mills relative to baladi mills. Reality may involve both of these explanations. However, their margins are rapidly diminishing as competition drives down the price of fino flour. Also, some have argued that baladi mills are operating below the sustainable breakeven point.

If tacit collusion existed in fino flour pricing, predatory behavior and under-capacity utilization should erode price cost margins, at least temporarily in an environment of excess supply. On the other hand, the excess supply may cause mill failures where technological efficiency is highest. Estimates of average milling costs at Egyptian fino mills were in the LE 68-75/ton range at full capacity. These cost figures suggest that if mills can survive in the newly competitive domestic environment, there is potential for Egypt to compete internationally in flour milling.³⁸

6.3.4 Structure of Baladi Mills

Eighty-six percent of baladi flour is milled at the 109 public mills spread throughout the country. The remainder is produced at 33 private mills contracted by the government specifically for milling baladi flour. The contracted mills are generally located in either Cairo or the Delta. Baladi milling is fully regulated by GASC such that all mills produce only baladi flour and are fixed to a quota system. While entry into baladi flour production is only dependent upon securing a government contract, profit incentives to enter this market are slim.

³⁸Krenz, 1998, p.26

Baladi mills utilize one of three technologies. Listed in the order of sophistication, the mills use either stone, old cylinder or new cylinder technology. Nearly half of the public mills and all of the privately contracted baladi mills are stone mills; this may explain the lower average milling capacity of 142 tons/day relative to the fino mills. The average capacity of the privately contracted mills is 86 tons/day. Most baladi mills range from 12 to 230 tons/day in capacity.

6.3.5 Conduct of Baladi Mills

Baladi mills receive both domestic and imported wheat for processing. The domestic wheat is delivered to the mills by independent traders, PBDAC, cooperatives and farmers. As much as 80% of wheat milled into baladi flour is imported and arrives to the mills via GASC transportation. As with fino public mills, baladi mills have little role in the wheat supply channels. GASC fixes a mill-specific price of wheat supplied according to ownership, technology and age of the mill. Private mills are smaller on average that public mills and receive a lower milling fee.

The wheat input is processed and sold to the flour and bran markets. The GOE sets bran prices, but these prices are not enforced. Thus, mills do have opportunities to seek profits in selling bran at a higher free market price. Flour stores pay mills LE 500/ton for baladi flour, and bakeries pay mills LE 290/ton for flour. GASC subsidizes the bakery sales by LE 210/ton, leaving millers price indifferent between the two outlets. Transportation logistics are not considered in that GASC pays for all transportation costs for the public mills. Transportation cost for private mills represents 11% of their operating costs.

Millers have little flexibility in the input procurement or marketing aspects of their business. As long as there exist supply of wheat to mills, ready buyers of baladi flour, and profit incentives for mills, their objective must be either to maximize quantity sold or to minimize costs. The former is only appropriate if mills operating at under-capacity can influence the quantity of GASC supply. Another method suggested by which millers can increase quantity sold is to increase the moisture content of the final flour product beyond regulation specification.³⁹

The latter objective of minimizing costs is perhaps more universal but often less effective. Many of the costs incurred at the mills are either fixed costs or per unit costs which cannot be altered. Labor is the largest variable cost item for public mills. Private mills incur large energy costs from which public companies are sometimes exempt. These costs would be lessened by steady processing of wheat, but since wheat supply is not controlled by the mill, and baladi mills have only an average of 3 to 4 days of storage capacity, mills can do little to minimize variable costs.

6.3.6 Performance of Baladi Mills

The average milling fee for public baladi mills is LE 30 to 46/ton; the fee for privately contracted mills is only LE 25 to 35/ton. GASC wheat supply prices are determined by size, age, and ownership of the mills. There is not data available to determine the mechanism or bias of this determination.

³⁹Krenz, 1998, p.17.

Private mills are located in the traditional farming areas of the Delta and South Cairo, which may imply that private mills are older on average than the public ones. Private mills are also smaller in size. Both of these structural considerations may induce higher GASC input prices. These items also may imply higher costs in production. IFPRI has shown that there are scale effects in milling. The result is that the price-cost margin for private baladi mills would probably be lower than that for public mills unless private mills either 1) achieve higher milling performance and equipment maintenance which reduces costs or 2) are able to capture more supply channels such that their production operates at capacity level.

Estimates of operating profit margins in Table 4.6 confirm a difference in performance between public and private mills. The average operating profit margins, without considering the cost of capital, are LE 18.4/mt and LE 10.4/mt for public and private mills respectively. However, all private mills utilize stone mill technology, and the public mills use either stone, new cylinder or old cylinder technology. Thus, a more technically equivalent comparison shows that the estimate of the profit margins of public stone mills and private mills are identical. A closer examination of these estimates reveals that the public stone mills have a higher milling fee on average than private mills and yet obtain only the level of profitability equivalent to the private mills. This result suggests that there are some efficiencies to be gained from privatization.

A final consideration of the performance of baladi mills would question whether the above margins are sufficient to meet the costs of capital not included in the operating margins. In the IFPRI survey of mills, many managers and owners of baladi mills complained that the GASC fee did not even cover their costs⁴⁰. Such a situation might encourage millers not to comply with the baladi flour procurement system if there were avenues to sift wheat further and sell the production at higher rates as fino flour. However, if leakages are feasible in the system, reasons would exist to exploit the opportunity whether the mill were profitable or not.

6.3.7 Structure & Conduct of Village Mills

Over 5,200 licensed and perhaps 8,700 unlicensed rural mills operate a service-oriented business of milling wheat for producers on demand. These millers may grind approximately 4 million tons of wheat per year at a capacity of up to 50 tons/day, although the capacity and use of the mills depends respectively on location and season. On average, mills charge LE 42/ton for wheat milling and have a price-cost margin of LE 18/ton. Their largest costs are energy and communication, labor, and equipment maintenance, which each account for about 30% of total costs. These figures are little variant with mill size.

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⁴⁰ Kherallah et al. 1998, p.99.

6.4 Consumption

6.4.1 Structure of Consumer Markets

Egyptians consume large per capita quantities of wheat that is either held in storage from a producer's harvest or purchased in the market as bread, flour, pasta or bran. The GOE subsidizes baladi bread and flour in order to provide affordable basic nutrition to the population. Consumers purchase baladi bread and flour at fixed prices in bakeries and stores which are furnished with baladi flour directly from the mills. This flour is delivered daily to bakeries and flour stores as governed by a GASC quota system. On average, the 20,000 flour stores and the 10,500 bakeries receive respectively 60 tons and 340 tons of flour per year.

6.4.2 Conduct of Consumer Markets

Although wheat consumption varies with demographic, social and economic factors, the per capita wheat consumption in Egypt has remained fairly constant at 180 - 200 kg/year over the period 1980-1997. Consumption of wheat products offered in the market has grown more or less at the rate of population growth. Of these amounts, 50% of wheat is consumed in baladi form; 13% in fino bread and flour; and 37% in rural varieties. This distribution has likewise remained relatively constant over the period with fluctuations due to the market for fino products.

Consumers of baladi bread and flour are price takers. The availability of subsidized bread and flour determines the quantity consumed, and recently the GOE has made efforts to limit the coverage of the flour and bread subsidies. There is an inherent urban bias in the subsidy program in that of the 5 million metric tons of baladi flour produced at the mills, 60% is delivered to urban bakeries, 13% to rural bakeries, 7% to urban flour stores and 20% to rural flour stores. It would seem that urban consumers have a preference for baladi bread, while, as the figures suggest, rural consumers purchase the subsidized flour. The price of both baladi bread and flour have increased slightly in nominal terms and decreased in real terms during the 1980-1997 period. Yet, demand response is not a consideration at the subsidized price level because there is always excess demand.

The fino flour and bread market subsidies were removed in 1987. A resulting rise in prices lasted through 1990 in real terms and through 1997 in nominal terms. Consumption of fino flour, which had been rising until 1987, fell sharply from 1988-1990. Quantities consumed have been stable since 1991. We can infer that fino demand is price responsive to real prices. In 1998 and 1999, as new private fino mills begin production, we expect to see consumption quantity increase. Given that the price of fino flour has been more than four times that of baladi flour and that baladi products are consumed in the maximum quantities provided under the subsidy, it seems that the wheat goods do not act as close substitutes in the market.

6.4.3 Performance of Subsidy to Consumer Markets⁴¹

In the period from 1980-1986, the GOE reduced its food subsidy costs from 14% to 5.5% of total government expenditures by removing food items from inclusion and by restricting access in some products. Baladi bread and flour subsidies account for three fourths of the remaining costs of food programs. Since approximately 80% of wheat utilized in the baladi subsidy is imported, the cost not only fluctuates with the international price of wheat, but also causes large outflows of capital. Additionally, because the subsidy wholesale price of flour is low relative to that of fino flour, the subsidy encourages leakages.

The subsidy is dispersed across income levels and is favored towards urban consumers. Ahmed, Bouis, and Ali find that for every LE 1.16 spent by the GOE, LE 1.00 accrues to the consumer, but the GOE must spend LE 2.80 to induce a LE 1.00 benefit to a needy consumer. In other words, although the program incurs only 16% in overhead costs, but this figure is magnified to 180% for reaching the target subsidy groups.

⁴¹ All of the figures in this section are drawn from Ahmed et al. 1998.

7. POLICY OPTIONS

This section examines some policy options that could be considered by GOE to render the wheat/flour/bread sector more efficient. They are discussed more or less in order of importance, although many of them are related and need to be considered as a package. In addition to the evaluation of these policies, there is also some discussion of paths that might be used to implement the policies.

7.1 Privatization of Public Flour Mills

Privatization of public flour mills is at the top of the list because of its urgency. Doing something about the public flour mills is urgently needed not just because of the standard reasons for privatization, but also because of the particular situation in the flour milling sector at this time. By the end of 1999, Egypt is likely to have double the milling capacity needed for 72% flour. There have been major private investments in new mills using modern cylinder milling technology. This investment was made after the public sector signaled it was going to privatize fino flour production and distribution. Clearly if nothing is done, there will be fierce competition among mills, both public and private, to use capacity to the maximum extent possible. The problem is that the public and private sector mills are not on the same footing. The public sector mills often have older less efficient technology, but they do not have charges for amortization of capital, finance, or taxes. Also, the public fino mills have been allowed to accumulate debt owed by their distributors. Because of these differences, the public sector mills stand to fare quite well in competition with the new private sector mills. With so much excess capacity, there will clearly be mills and firms leaving the sector within a short time. Under the current policy environment, the older less efficient public mills possibly could win out at least in the short run, and some of the newer more modern private mills could go under.

This outcome would constitute a real loss for the Egyptian economy as it would maintain older less efficient technology and lose newer more efficient mills. This perverse outcome would arise because the public and private mills are not competing on the same basis. The greater economies and efficiencies of the new private mills might not be sufficient to overcome the tax, finance, and depreciation advantages (plus debt accumulation) of the public mills. Hence, continued public ownership of fino mills in the current situation of excess capacity will result in the sector becoming less efficient. Also, such an outcome would diminish the credibility of policies to encourage private sector investment.

The bottom line is that this privatization action takes high priority because significant damage could result in the sector if something is not done quickly. Several alternative means could be used to accomplish the privatization. The fino mills could be split off into separate entirely private companies and existing shares allocated according to value proportions. Alternatively, the public sector could be restricted to production of baladi flour only with fino left entirely to the private sector. If that were done, the older less efficient baladi mills could be closed and/or sold for the value of the property one which they reside.

If the public mills were privatized quickly, they would be forced to compete on a somewhat more equal basis. Many of them would not have much value in the current competitive environment,

and would be forced to close. In some cases, the value of the land is worth more than the mill. Those mills should be sold for the land value and closed. It is quite important to make arrangements to buyout or otherwise compensate the workers who would be displaced by such actions. However, the proceeds from the sale should be sufficient to provide compensation for the workers.

7.2 Moving to a Tender System for Baladi Flour

At present, production of baladi flour is negotiated on a case by case basis with both public and private mills producing the flour. Mills are paid margins based upon an estimate of their costs. This policy alternative would change that system to a tender system with public and private mills bidding for the right to produce the flour. That is, periodically the government would announce a tender for a given quantity of baladi flour to be delivered to a specified location. Mills would be free to procure their wheat either on the domestic or import markets. They would be free to sell the bran at whatever price they can get. They would be free to transport wheat as needed within the country.

There are several types of auctions that could be considered. If this approach were to be adopted, it would be a good idea to do pilot auctions in certain regions before going nationwide. For example, if public mill privatization could be accomplished quickly in one region, that might be a good region to pilot the tender system.

One concern with this approach is that significant economies of scale might be lost in the purchase and import of grain. The general perception is that GASC does a good job of importing grain and a reasonable job of assembling domestic grain. If individual mills or groups of mills became responsible for their own procurement, the economies of large scale purchasing might be lost. The next alternative deals with this issue.

7.3 Tender for Baladi Flour Milling

This approach is similar to the second option except that GASC would provide mills with the grain, and the competition would be over the milling charge. That is, mills would bid on a per ton of wheat milled. The tender would specify the quantities desired, timing, location, etc. Firms would bid on a milling fee. This approach is similar to the current situation except that rather than being negotiated, the milling fees would be competitive.

This alternative might be a reasonable approach to begin a competitive process. After gaining some experience, the government and private sector might be ready to move to the second alternative above. Before doing that, though, it would be advisable to study the economies of scale issue associated with grain procurement. They could be quite large, or they could be much smaller than currently believed. The main issue is the ability to purchase at least a 50,000 ton boat load. Shipping costs get much higher with smaller boat sizes. To the extent that mills or groups of mills can purchase in 50,000 ton boat loads, it is not clear there are significant economies of scale in importing beyond that.

Another variant would be to use a bidding process for the private sector mills that produce baladi flour and then establish the fees to be paid to public sector mills from a formulae based in part

on the outcome of the private sector auction. This route would ensure that much of the baladi flour production stayed in the public sector (holding companies) at least in the short run, but would provide a reason for them to become more efficient. Again, questions of treating fairly any displaced workers would have to be treated explicitly.

7.4 Removing Transportation Impediments

At present, there are restrictions on moving wheat from one governorate to another. In principle, many of the restrictions were removed, but there is plenty of evidence that restrictions still exist. The co-integration analysis of prices in different areas demonstrates that prices are not linked as closely as one would expect with free movement of grain. Free movement of grain would ensure that the grain ends up in the location where it has greatest value to the economy as a whole.

A governorate with an excess of grain might want to restrict exports in order to keep consumer prices low in the governorate. However, that policy also has the effect of keeping prices lower for farmers in that governorate than they would be with free movement.

Free movement of grain also helps to create a national market for wheat that encompasses all producing regions and imports. Such a market encourages efficient storage and transport. To implement such a policy would require a clear national directive as some of the local governorate officials can act independently.

7.5 Grading and Standards for Wheat

At present there are no <u>effective</u> standards for domestic wheat, and it is not rigorously graded. Thus there are no good reasons to produce and maintain a consistently high quality wheat. Institution of effective grading and standards could result in higher market prices for higher-quality wheat. Grading also could reduce the benefit from adulterating wheat with foreign matter such as sand. For domestic wheat to compete with imported wheat, standards are needed that provide the same kinds of quality premiums as exist on international markets.

7.6 Blending 82% Flour and Maize Flour at the Mill

One of the problems with the controlled 82% flour is that it is relatively easy to sift it down to 72% flour and sell it at a significant profit. If maize flour could be mixed with 82% flour directly at the mill, however, this fraud is much more difficult because the maize flour cannot be sifted out. In essence, the maize flour becomes a marker that preserves the identity of the 82% flour. Doing this would require a blender at the flour mill, which many do not have. However, it may be worth considering not only as a means to lower the cost a bit of the baladi flour, but perhaps more importantly as a means of discouraging fraud.

7.7 Privatizing Public Transport and Storage

With all the changes that have occurred in the wheat/flour markets since 1992/93, there is little reason to maintain public transport and storage facilities. These could be privatized and made to compete with private sector entities.

7.8 Linking Domestic and World Wheat Markets

At present, Egypt establishes a procurement price for domestic wheat and imports world market wheat at whatever the price is. The two markets are treated separately. This separation has not been a problem until very recently as the difference between import and domestic prices has been small. To the extent that a difference existed in the past, the domestic price was greater than the import price. However, today that situation is very different. Import prices are now considerably less than domestic prices. Using the October 1998 U.S. Gulf prices adjusted for shipping to Egypt, the nominal protection rate is now about 23 percent. That is, imported wheat is now about 23 percent cheaper than domestic wheat at the official procurement price (with both imports and domestic wheat values adjusted for transport to a mill).

Given this significant difference, the government has three major choices: 1)Try to continue to use regulations and controls to keep the two markets separate, or 2)Institute some sort of border protection to keep the imported wheat priced near the support price for domestic wheat, or 3)Lower the domestic support price and keep it is line with the world price. Option 1 has the disadvantage that controls never work perfectly when price differentials are significant. Already, government officials are concerned about losses and leakage in the imported wheat market. Option 3 has the disadvantage that it may be politically quite difficult to lower support prices and to vary them from year to year in conjunction with movements in world prices.

If the government wants to consider some sort of border protection (option 2), the question, then is what kind of protection. The standard form of border protection is an ad valorem tariff. That is, the tariff is a specified percentage of the CIF price of the commodity. The ad valorem tariff is very simple to administer, but it transmits all the variability in world market prices to domestic markets. If fact, it amplifies that variability:

$$_{d} = (1 + t) *_{w}$$

as domestic price variability (measured by the standard deviation), $_{\rm d}$ is 1+t times the world price variability, $_{\rm w}$.

To illustrate the impact of using the ad valorem tariff method of border protection, we have taken monthly data of world wheat price using the U.S. Gulf price from 1986 through October 1998, assumed a \$10 shipping cost per ton, and used a uniform exchange rate of LE3.4/\$. Of course shipping costs and exchange rates have varied over this period, so the actual variability may be a bit understated. Nonetheless the data series and assumptions are quite adequate to illustrate the differences in border protection alternatives.

Figure 7-1 illustrates the ad valorem tariff option assuming a 20 percent tariff rate applied to the CIF prices calculated as described above. As is clear from this figure, the ad valorem tariff provides a wedge between world and domestic prices, but does not provide any measure of domestic price stability. If fact, the absolute size of the wedge increases as world prices increase. Hence, this border measure does not accomplish the price stabilization objective at all.

Figure 7-1

Ad Valorem Tariff

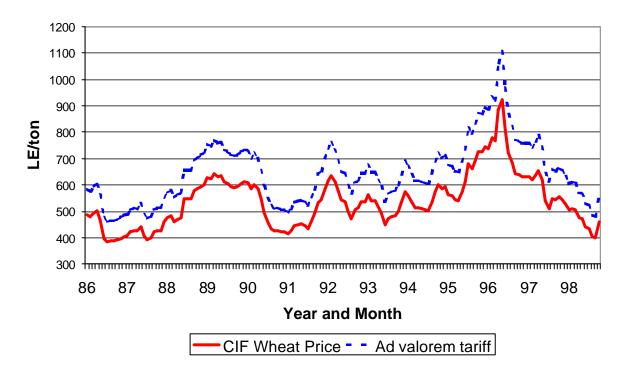


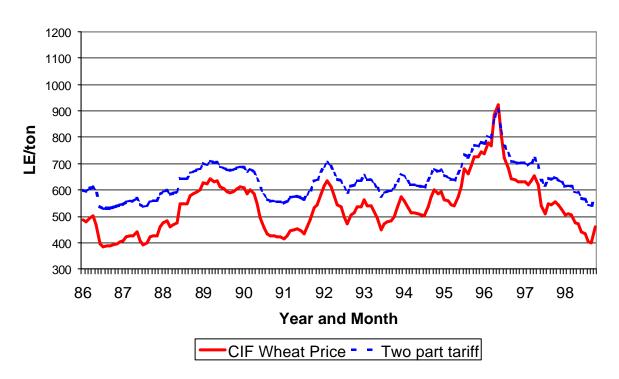
Figure 7.1: Ad Valorem Tariff

Another option would be a two part tariff, which is, in essence a combination of a specific tariff (fixed amount per ton of wheat) and an ad valorem tariff. A variant of this system is used in Morocco. For purposes of illustration, we have simulated a two part tariff with a base rate of 30 percent applied to the first 400 LE of the import price, for a specific tariff of 140 LE. A deductive rate of 30 percent is then applied to the difference between the CIF price and 400 LE, and that amount is deducted from the specific tariff. For example, if the CIF price were 500 LE, the total tariff would be 140 - 30 = 110. This approach has the merit of making the total tariff vary to some extent inversely with the level of the CIF price. In other words, the percentage tariff declines as CIF price rises. For example, the percentage tariff for the 500 LE CIF illustrated above would be 22 percent, whereas the percentage would be 13 for a 600 LE CIF price. The simulation of this option is illustrated in Figure 7-2. Clearly, this approach does a better job of maintaining domestic price stability than the ad valorem tariff, but still leaves quite a bit of variability.

A third option would be a variant of the price band system used in Chile. Under this option, the ad valorem tariff rate varies with the import CIF price. The values used for this simulation are

contained in Table 7-1. The results of the simulation are illustrated in Figure 7-3. This option clearly Figure 7-2

Two-Part Tariff



does a nice job of maintaining domestic price stability except under the most extreme fluctuations in world price. Some variant of this system might be considered in Egypt if the government decided it wanted to go with a tariff link between domestic and world prices.

Figure 7.2: Two-Part Tariff

Table 7-1: Price Band System

CIF Price Range	Tariff Rate (%)
0 - 400	60
401 - 450	45
451 - 500	30
501 - 550	20
551 - 600	10
601 -650	5
651 +	0

Figure 7-3

Price Band Tariff

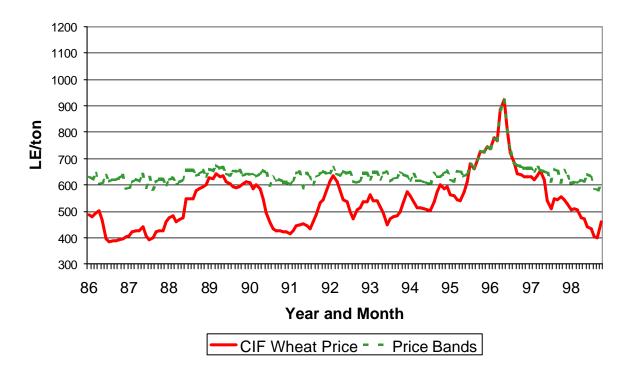


Figure 7.3:: Price Band Tariff

The Egypt GATT binding on protection level for wheat is 5 percent. Clearly, with the current difference between domestic and imported prices, a way around that GATT binding would have to be found to use any of these systems. However, the current approach of separating the markets by government edict is effectively the same as a tariff at the nominal rate of protection, which makes the protection much greater than 5 percent. If the government decided that it wanted to go with some form of domestic and world price linkage as in one of the variants of option two, this author suspects that a way around the GATT binding could be found.

Theoretically, another means of supporting domestic wheat price indirectly and at the same time linking it to world markets is a system of import duties called a variable levy. Under a variable levy, the tariff is set equal to the difference between a target price and the CIF price. For example, if the target price were 640 and the CIF price were 500, then the tariff would be 140. Following GATT, a variable levy is not, strictly speaking, WTO legal, but there are variants that are WTO legal. The following calculations show how the link works:

Wheat CIF cost (+ duty) of \$185 x 3.4LE/\$	629
+Port charges	40
+Transportation to the mill	35

=Import cost at the mill		704
-Cost of transporting from farm to mill	35	
-Quality differential		30
=Farm gate import equivalent price		639

The numbers here are fictitious, but they serve to illustrate the linkage. If the actual CIF wheat cost were \$155, then the duty would be about \$30 to get a CIF plus import duty of \$185. In practice, one would start with the desired farm gate price (640 in this example) and work backwards to a target price for imports that would achieve the desired farm gate price. To the extent that there is a quality differential, one would need to factor that in as well.

Price band, two-part tariffs, and variable levy type systems isolate the domestic market from the sometimes wild fluctuations of world market prices, but at the same time establish a clear linkage between domestic and import prices. They obviate the need for a domestic support or procurement price because that is done by the market given the policies illustrated here. Also, they do not increase the cost of the wheat subsidy because the higher cost of imported wheat is offset by the revenue generated from import tariffs. Additional government revenue would be generated on that wheat destined for fino flour.

These policy alternatives might be appropriate once many of the other liberalization and privatization changes had been made. They would not work as well, for example, if transport restrictions still existed on grain or restrictions on trading imported grain. Also, this policy approach would lead to somewhat different effective farm gate prices in different parts of the country, which is common in a market system. If there are strong political reasons (other than historical precedent) why pan-territorial pricing must be used, then some sort of direct price support or procurement mechanism needs to be used.

Finally, this approach would not isolate the country from high peaks in world market prices such as those experienced recently, unless the import duty were made symmetric - that is, unless it provided a rebate to importers when import prices were greater than the target import price. That procedure can be complicated to administer, and we do not recommend applying it. A better alternative would be to fix the target price slightly above the trend in world prices and permit significant upward deviations from the trend to be passed on to local markets.

7.9 Changing the Form of the Bread Subsidy

This study has assumed that the baladi bread/flour subsidy will remain essentially as it is. However, many of the IFPRI documents have proposed alternative means of administering the subsidy, which could increase efficiency or reduce the subsidy cost through targeting. As the rest of the wheat/flour market reforms as being considered or implemented, some of the IFPRI recommendations on subsidy changes should be considered.⁴²

⁴²For more details and analysis of the IFPRI proposals, see Löfgren et al. 1998, Ahmed, Bouis et al. 1998, and Bouis et al. 1998.

7.10 Improved Information Systems

Improved quality, timeliness, and breadth of information is needed to help ensure the smooth functioning of a competitive wheat marketing system. Improved forecasts and estimates of regional and national wheat production are needed to guide import decisions in the private and public sectors. The statistical unit must attain an independence from political aims such that a high value is placed on objective indications of the production estimates.

In addition, the state may want to consider playing a role in providing time series information on international market prices and forces. Much of this information is available on the Internet, so it may be more appropriate to provide training courses to private sector traders.

7.11 Clarifying the Rules on High Quality Flour

At present, millers of high quality wheat must make 72% extraction flour. There is no reason to prohibit millers and companies from trying to establish brands for particular market niches. While less than 72% extraction poses a potential problem with fraud, there is no reason to prevent millers from producing finer extraction wheat for particular consumers. One miller believed that was legal now, but the others indicated it was not. Niche market flour for specific needs will emerge so long as there are no government restrictions.

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PERSONS INTERVIEWED

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ANNEX:

DATA ON WHEAT

This annex contains a description of the data base that needs to be maintained and monitored in order to verify changes that occur over time in the wheat/flour subsector. It is structured in the same order as the main text. Many of the data sets that should be maintained are included in the main text in the form of tables, so this annex refers to the text table number for reference. Other data was used in the analysis but not reported in detail in the text. It was provided to the project in spreadsheet form and is described here.

A.1 Production

The following data series related to wheat production and supply should be maintained:

- 1) Wheat area, yield, and production This data is widely available. The series was reconstructed into an Excel spreadsheet with data on lower, middle, and upper Egypt plus totals (Table 2-4). The series dates back from 1980 to 1997, and should be updated annually.
- 2) Wheat production cost The decomposition of wheat production cost is contained in Table 2.5. That series runs from 1988 through 1997 and should be updated annually.
- 3) Data related to wheat supply response In estimating wheat supply response, the farm level wheat price, the wheat procurement price, the price of chemical fertilizer, fava bean price, fava bean area, and berseem area cultivated are variables that were considered. The series on these variables runs from 1980 to 1996 and should be updated annually. If possible berseem price should be added to the series. While all these variables were not used in the supply response reported here, they might be useful in future supply analysis.

Much of the other data reported in Chapter II came from the IFPRI producer survey. The data on producer marketing outlets (Tables 2.1 and 2.2), prices received (Table 2.3), storage (Figures 2.3 and 2.4), and transportation (Figures 2.6 and 2.7) is useful and interesting. To the extent that there is interest in the structure and conduct of farmer markets and marketing decisions, it would be useful to repeat that survey in about five years.

A.2 Imports

The following data series should be maintained for wheat imports:

- 1) Wheat and flour imports Table 3.1 contains this series. Table 3.2 contains the breakdown of imports by importing entity. Both series should be updated annually.
- 2) Wheat import average prices Figure 3.2 contains the monthly average wheat import price calculated from data on import value and quantity. That data also should be updated annually.

A.3 Wheat Transformation and Distribution

The following data related to wheat milling and distribution should be maintained:

- 1) Wheat mills, capacity, and ownership Tables 4.1 and 4.2 contain the number of mills by ownership, capacity, and type of flour produced. That data should be updated at least every other year.
- 2) <u>Geographical distribution of village mills</u> Table 4.4 contains the number of village mills by province. It would be very useful to improve this data by obtaining milling capacity and data on both licensed and unlicensed mills. Also, it would be useful to obtain data on the amount of milling capacity on farm by region. One of the greatest data weaknesses in the transformation area is in the small village and farm mills.

Much of the other data reported in Chapter 4 came from the IFPRI miller survey or their reports on millers and traders. There are a series of tables reporting various components of and perspectives on milling costs and another set characterizing traders. It would be useful to repeat the miller survey in about five years with the inclusion of the new private mills to the extent possible. Also, monthly data on wheat prices would be useful in analyzing trader behavior.

A.4 Consumption

The following data series related to consumption should be maintained:

- 1) <u>Total and per capita flour consumption</u> Table 5.2 contains the time series of baladi and fino flour consumption both total and per capita. That series should be updated annually.
- 2) Flour and bran prices Table 5.3 contains the time series of flour prices for baladi and fino flour destined for bakeries and warehouses (to be sold directly to consumers). It also contains bran and retail flour prices. These prices all should be updated annually.
- 3)<u>Baladi bread consumption</u> Table 5.4 contains the time series of baladi bread consumption in total and per capita plus bran consumption. These data also should be updated annually.
- 4)<u>Food subsidy costs</u> Tables 5.6 and 5.7 contain data on food subsidy costs both in total and as a percentage of full costs. While some of this information is not directly applicable to the wheat/flour subsector, this data should be updated annually for consideration by policy makers.

Most of the rest of the data reported in Chapter V reports the regional distribution of subsidized wheat/flour products. That data should be updated about every five years.

A.5 Conclusion

The final two chapters of the main report contain the analysis of structure, conduct, and performance and consideration of policy alternatives. Very little new data is introduced in those chapters.

We believe that if the above mentioned data is maintained or collected with the frequencies given, it will be possible to monitor and verify changes in the wheat/flour subsector.